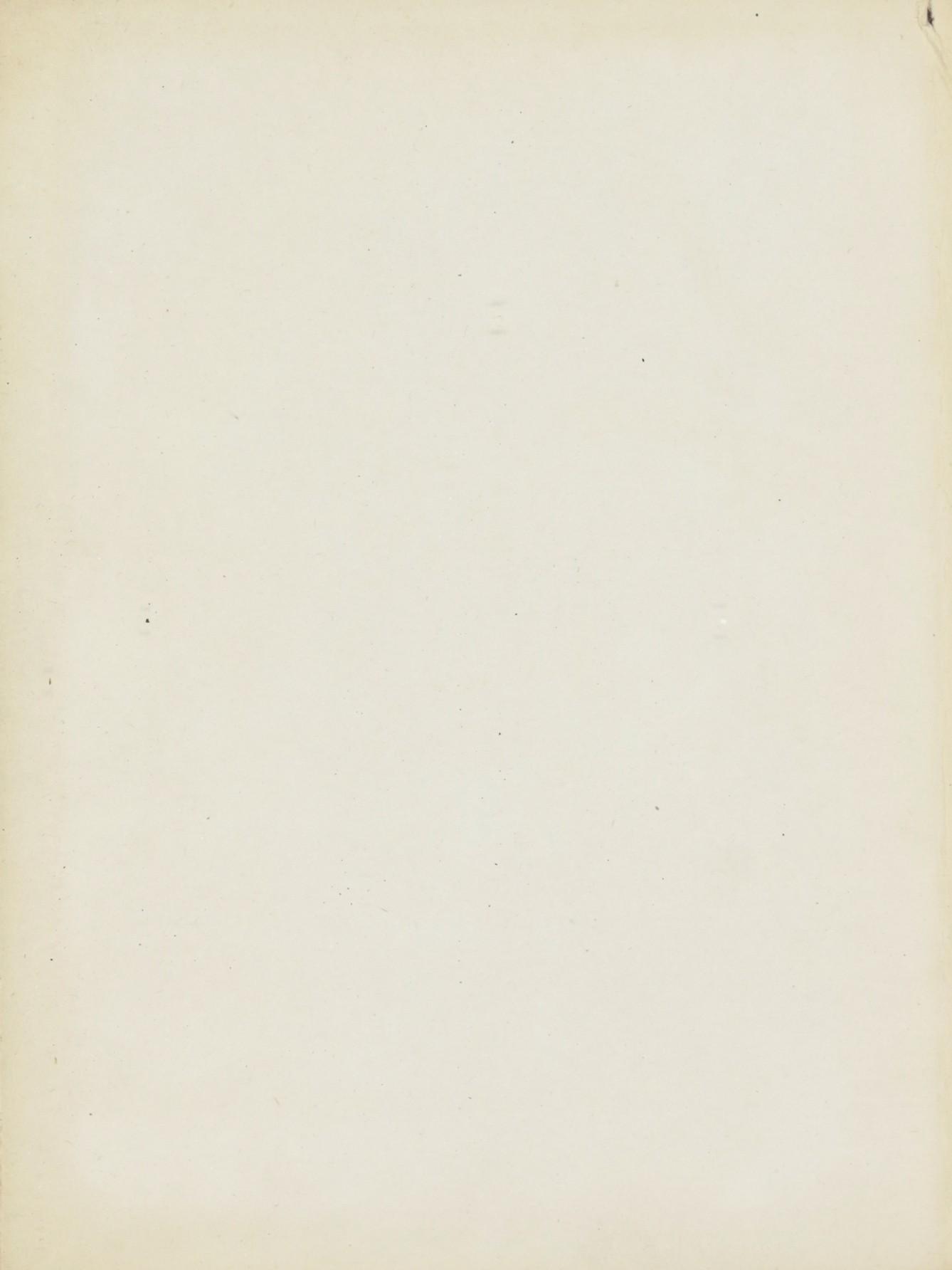


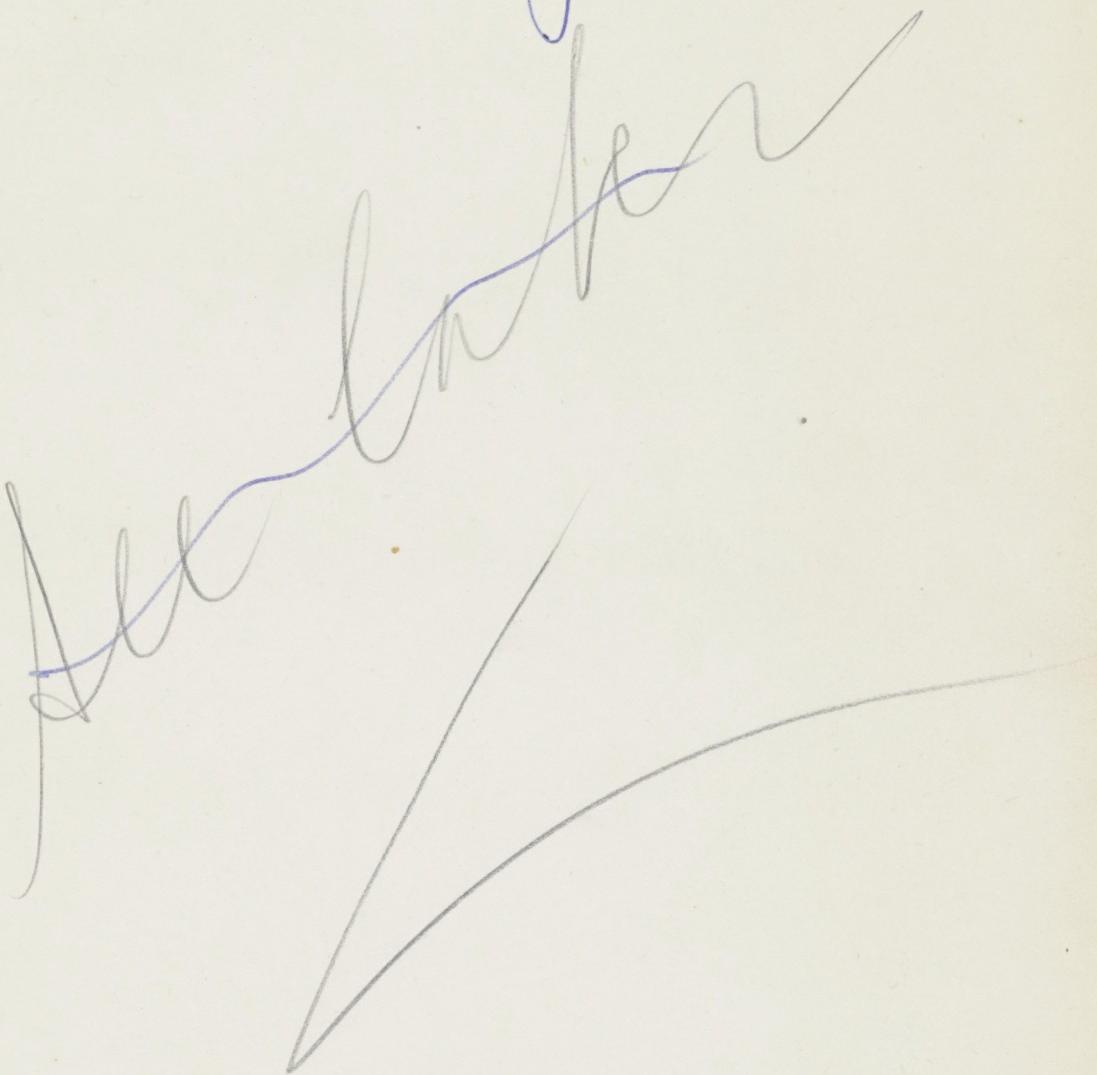
LLOYD'S REGISTER OF SHIPPING

RULES FOR WOOD AND COMPOSITE SHIPS



Stanley Townshend

J. B. Dauril



LLOYD'S REGISTER OF SHIPPING.

RULES AND REGULATIONS.

Lloyd's Register of Shipping.

FOUNDED 1760.

RE-CONSTITUTED 1834.

UNITED WITH THE
UNDERWRITERS' REGISTRY FOR IRON VESSELS IN 1885

RULES & REGULATIONS

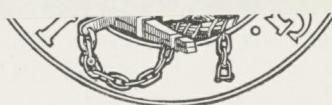
FOR THE

CONSTRUCTION AND CLASSIFICATION OF WOOD VESSELS.



NOTICE.

The Rules for the Survey and Construction of Machinery are not bound up with the Rules for Wood and Composite Vessels, but they can be obtained upon application.



OFFICE: 71, FENCHURCH STREET, LONDON, E.C.

1916.

СЛОВОК.

Задача ученых за последние годы — это изучение языка и языковой культуры народов Сибири и Дальнего Востока, а также изучение языкового материала, полученного из письменных источников, в том числе из языковых памятников, написанных на языках, неизвестных до сих пор.

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LONDON:

PRINTED BY LLOYD'S REGISTER OF SHIPPING, AT THE SOCIETY'S
PRINTING HOUSE, 64, SOUTHWARK STREET, S.E.

1916.

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LLOYD'S REGISTER OF SHIPPING.

RULES AND REGULATIONS.

Section 1. This Society, formed in 1760 and reconstituted in 1834, was established for the purpose of obtaining for the use of Merchants, Shipowners and Underwriters a faithful and accurate Classification of Mercantile Shipping, and for the government of which the following Rules and Regulations have been from time to time adopted.

Section 2. A Register Book to be printed annually for the use of Subscribers, containing the names of the Ships with other useful information, and the Character assigned, where the vessels are classed by the Society; also the names, &c., of all Ships of 100 tons and upwards unclassed by this Society.

Section 3. Each person subscribing the sum of Three Guineas per annum (or such other sum as the General Committee may fix) to be considered a Member of the Society, and entitled *for his own use* to one copy of the Register Book.

Section 4. The subscription of Marine Insurance Companies, Public Companies or Public Establishments to be Six Guineas per annum, for a single copy of the Register Book and Three Guineas per annum for every additional copy supplied, unless the copies be periodically posted with type with additions and corrections throughout the year, in which case the subscription for each copy supplied will be Ten Guineas per annum.

Section 5. In the case of other Subscribers, the subscription to be Three Guineas per annum for each copy, unless periodically posted with type with additions and corrections throughout the year, in which case the subscription will be Five Guineas per annum for each copy supplied.

Section 6. For the convenience of Subscribers not resident in London, or whose Register Books are not posted, a Supplement, containing the additions to, and corrections made in, the Register Book, to be printed fortnightly, in such convenient form as to admit of its transmission by Post, so that such parties may be furnished, from time to time, with the latest and most complete information.

Section 7. The superintendence of the affairs of the Society to be under the direction of a Committee of Merchants, Shipowners, and Underwriters (twenty-four elected in London and thirty-seven at the principal Outports), ten Shipbuilders and/or Engineers (elected by the General Committee), and any additional Members, not exceeding four, who may be elected by the General Committee. In addition, the Chairman, or, in his absence, the Deputy-Chairman of the Corporation of Lloyd's, and the Chairman, or, in his absence, the Deputy-Chairman of the General Shipowners' Society, for the time being, to be, *ex-officio*, Members of the Committee.

Any member (except an *ex-officio* member) who fails to attend any meetings of the Committee for a period of six continuous months, without leave of absence, shall cease to be a member, and his place shall be filled up in the usual way.

NOTE.—Official intimation to be given in June of each year whether the Chairman or Deputy-

Chairman of the Corporation of Lloyd's, and the Chairman or Deputy-Chairman of the General Shipowners' Society, are to be the ex-officio members for the ensuing twelve months.

Section 8. The General Committee reserve the right of varying or withdrawing the representation of Outports, and of Shipbuilders and Engineers: also the representation of Shipbuilders, Engineers, Steel Makers, and Forgemasters on the Technical Sub-Committee hereinafter mentioned, as well as the mode of election of members.

Section 9. 1. Six of the Members elected in London, namely, two of each of the constituent parts of the Committee, to go out annually by rotation, but to be eligible to be re-elected. The vacancies so arising to be filled up by the election of two Underwriters and one Merchant by the Committee of Lloyd's, and two Shipowners and one Merchant by the Committee of the General Shipowners' Society.

2. Of the Members elected at the Outports twenty-one to retire at the end of every four years, and seven of the Members elected at Liverpool and the nine Members elected at Glasgow to retire annually. The retiring Members are eligible for re-election.

3. The ten Shipbuilders and/or Engineers, and any additional Members, elected by the General Committee, to retire at the end of four years. The retiring Members are eligible for re-election.

Section 10. The Committee to appoint Sub-Committees of Classification, to be so regulated that each Member of the General Committee may, in rotation, take his turn of duty thereon throughout the year.

Section 11. The Committee to appoint from their own body, annually, a Chairman and Deputy-Chairman; and also a Chairman or Chairmen of the Sub-Committees of Classification.

Section 12. The Secretary, Clerks, and Servants of the Society, and the Surveyors, to be appointed by and be under the direction of the General Committee.

Section 13. Special meetings to be convened by order of the Chairman, or Deputy-Chairman, or on the requisition of any three Members.

Section 14. All elections and appointments to be made by ballot, excepting when in the election of Chairman, Deputy-Chairman, or Chairman, or Chairmen of the Sub-Committees of Classification, only one person is nominated for each office.

Section 15. No Member of the Committee to be permitted to be present on the decision of the classification of any ship of which he is the owner, or wherein he is directly, or indirectly interested.

Section 16. 1. The Committee to be empowered to make such Bye-laws for their own government and proceedings as they may deem requisite, not being inconsistent with the original Rules and Regulations under which the Society was established; but no new Rule or Bye-law to be introduced, or any Rule or Bye-law altered, without special notice being given for that purpose at the Meeting of the Committee next preceding that at which such Motion is intended to be made; such notice to be inserted in the summons convening the meeting.

2. No new Rule, or alteration in any existing Rule materially affecting the classification of Ships, to be applied compulsorily to vessels of which the plans have been submitted and approved before the expiration of six months after the date when the change has been adopted.

Section 17. 1. That fifteen representatives of Shipbuilders, Engineers, Steel Makers, and Forgemasters shall be admitted as members of the Technical Sub-Committee on all occasions when it is proposed to make alterations in the existing rules, or to frame new rules, for the construction of ships or machinery.

2. That twelve representatives of Shipbuilders and Engineers shall be elected by the following bodies, viz. :—

- (a) The Institution of Naval Architects, London ;
- (b) The North-East Coast Institution of Engineers and Shipbuilders Newcastle-on-Tyne ; and
- (c) The Institution of Engineers and Shipbuilders in Scotland, Glasgow,

two shipbuilders and two engineers being elected by each body ;

That two representatives of Steel Makers be elected by the Iron and Steel Institute, of whom one is to represent England and Wales and the other Scotland ; also

That one representative of Forgemasters be elected by the English and Scottish Forgemasters' Association.

3. That the representatives shall be elected for a term of four years, but in the event of any vacancy occurring before the expiration of this period a representative may be elected to fill the vacancy for the unexpired portion of the term.

4. That those only who are actually partners in firms, or managers of joint stock companies, engaged in Shipbuilding, Engineering, Steelmaking, or the Manufacture of Forgings, shall be eligible for election.

5. That the Chairman of the Committee of Lloyd's Register of Shipping, for the time being, or, in his absence, the Deputy-Chairman ; or, failing him, some other member of the General Committee shall preside at the meetings of the Sub-Committee.

6. That the representatives of Shipbuilders, Engineers, Steel Makers, and Forgemasters shall have the same rights and powers as the other members of the Sub-Committee in speaking and voting at the meetings of the Sub-Committee at which they are entitled to be present.

7. That it shall be open to representatives of Shipbuilders, Engineers, Steel Makers, and Forgemasters to propose alterations in, or additions to, the Rules for the construction of ships or machinery ; and that notice of all such proposals shall be sent in writing to the Secretary.

8. That meetings of the Sub-Committee shall be convened as often and at such times as may appear necessary to the General Committee, but there shall be at least two meetings in the year, though not necessarily one in each six months.

9. That every meeting shall be convened by notice from the Secretary at least one month before the date of meeting ; that the meetings shall, whenever practicable, be arranged for Tuesday afternoons ; that notice of matters proposed to be brought before the Sub-Committee by members shall be sent to the Secretary not less than fourteen days before the meeting, and the Secretary shall, as soon as possible thereafter, send to each member an agenda paper.

10. That the recommendations of the Sub-Committee shall be reported to the General Committee, who will refer them for consideration to a Special Meeting of the General Committee, as required by Section 16 of the Rules.

11. That in the event of eight representatives of Shipbuilders, Engineers, Steel Makers, and Forgemasters, actually voting together on any question, and nevertheless failing to obtain a majority of the Sub-Committee, it shall be open to them to present a minority report to the General Committee.

12. That the General Committee reserve to themselves the right of varying, adding to, or rescinding, at their discretion, any or all of the foregoing Rules.

Section 18. All Reports of survey to be made in writing by the Surveyors according to the form

prescribed, and submitted for the consideration of the General Committee, or of the Sub-Committees of Classification; but the character assigned by the latter to be subject to confirmation by the General Committee.

Section 19. 1. The reports of the Surveyors, and all documents and proceedings relating to the classification of ships are to be carefully preserved and to be open to the inspection of the Owners, but no other person or persons are to have access to such documents except with the written consent of the Owners and under the direction of the Chairman or Deputy-Chairman.

2. Copies of the original reports (if the ships be already classed, but not otherwise), so far as relates to the dimensions, scantlings, fastenings, and materials, in cases where the correctness of the reports in these particulars is certified by the builders, are granted on application.

Section 20. Foreign ships, and ships built in the British possessions abroad where there is not a Surveyor (*see also* Section 52 of the Rules for Wood Vessels), to be surveyed on their arrival at a port to which a Surveyor has been appointed; but a due regard is to be had to the circumstance of such vessels having been exempted from supervision while building, and the Character to be assigned to them is to be regulated according to their intrinsic quality and from the best information the Committee can obtain.

Section 21. In every case in which the Character assigned to a ship may be proposed, on survey, to be reduced, notice is to be given in writing to the Owner, Master, or Agent, with an intimation that if the reduction be objected to, the Committee will be ready to direct a special survey, on the Owner, Master, or Agent agreeing to pay the expenses attending the same, provided on the said survey there shall appear sufficient ground for the proposed reduction.

Section 22. 1. When the Surveyors consider repairs to be requisite, they are respectfully to communicate the same in writing to the Owner, Master, or Agent, and if such repairs be not entered upon within a reasonable time, a corresponding report is to be made, as soon as possible, to the Committee for their decision thereon.

2. All repairs of Ships or Machinery required at Ports where there is a Surveyor to this Society, in order to their obtaining a Character in the Register Book, or to their retaining the Characters assigned to them therein, must be carried out under the inspection, and to the satisfaction of the Society's Surveyors. Ships or machinery repaired at Ports where there is no Surveyor to this Society must be surveyed by one of the Society's Surveyors at the earliest opportunity.

Section 23. Parties considering the repairs suggested by the Surveyor to be unnecessary or unreasonable may appeal to the Committee, who will direct a special survey to be held; but should the opinion of the Surveyor be confirmed by the Committee, then the expense of such special survey is to be paid by the party appealing.

Section 24. The Surveyors to the Society not to be permitted (without the especial sanction of the Committee) to receive any fee, gratuity, or reward whatsoever for their own use or benefit, for any service performed by them in their capacity of Surveyors to this Society, on pain of immediate dismissal.

Section 25. The Surveyors will be directed to attend on Special Surveys of ships or machinery while building or under damage or repair, when required by Merchants, Shipowners, or Underwriters; the charge for which is to be regulated according to the nature and extent of the service performed. In all cases, the application for the assistance of the Surveyors must be made in writing addressed to the Secretary.

Section 26. While the Committee use their best endeavours to ensure that the functions of the Society are properly executed, it is to be understood that neither the Committee nor the Society are under any circumstances whatever to be held responsible for any inaccuracy in any report or certificate issued by the Society or its Surveyors, or in any entry in the Register Book or other publication of the Society, or for any error of judgment, default, or negligence of the Surveyors, or other Officers or Agents of the Society.

FUNDS.

Section 27. The Funds to be under the authority and control of the Committee, and a statement of the Receipts and Expenditure to be annually printed for the information of the subscribers.

Section 28. The following Fees to be charged to the Owners of ships prior to their vessels being classed and registered in the book:—

CLASSING FEES.

For First Entry of Class in the Register Book.

For each Ship under 200 Tons ...	...	...	...	...	£1	0	0
Ditto of 200 and under 500 Tons	...	...	...	...	2	0	0
Ditto of 500 " 1,000 "	...	...	...	...	3	0	0
Ditto of 1,000 " 2,000 "	...	...	...	...	4	0	0
Ditto of 2,000 and upwards	...	...	...	...	5	0	0

For First Entry of Notification "LMC" in the Register Book.

For each Ship under 100 nominal HP. ...	...	...	...	...	£1	0	0
Ditto of 100 and under 300 HP. ...	...	...	...	...	2	0	0
Ditto of 300 and above ...	...	...	...	...	3	0	0

SPECIAL SURVEYS.

Section 29. 1. For ships built under the special superintendence of the Surveyors (to entitle them to the distinctive mark \ddagger), 1s. per ton for the first 1,000 tons; and 6d. per ton for every ton from 1,001 tons to 10,000 tons; 4d. per ton for every ton from 10,001 tons to 20,000 tons; and 2d. per ton for every ton beyond 20,000 tons. No fee to be less than £7 0s. 0d.

2. For engines and boilers built under the special superintendence of the Surveyors (to entitle them to the distinctive mark \ddagger in red):—three shillings per horse-power for the first 200 horse-power; one shilling for each horse-power from 201 to 1,000; 6d. for each horse-power from 1,001 to 3,000; and 3d. for each horse-power beyond 3,000. No fee to be less than £8 0s. 0d.

The following rule is to be used for determining the Nominal Horse Power of Engines in regulating the fees for their survey, viz.:—

$$NH = \frac{P+340}{1000} \left(\frac{D^2 \sqrt{S}}{100} + \frac{H}{15} \right) \text{ where the boiler pressure is below 160 lbs.}$$

$$= \frac{P+590}{1500} \left(\frac{D^2 \sqrt{S}}{100} + \frac{H}{15} \right) \text{ where the boiler pressure is 160 lbs. or above.}$$

If the boilers are fitted with Forced Draught or Induced Draught appliances, then $\frac{H}{12}$ is to be taken instead of $\frac{H}{15}$.

where D =diameter of L.P. Cylinder in inches.

S =stroke in inches.

H =heating surface in square feet.

P =working pressure in lbs. per square inch.

The square feet of heating surface represented by H will comprise the surfaces of the tubes, of the back tube plate or plates, and of the furnace and combustion chamber plating down to the level of the fire bars.

The following rule is to be used for determining the Nominal Horse Power of Diesel Engines in regulating the fees for their survey, viz :—

$$NH = \frac{N \times D^2 \sqrt{S}}{80} \quad \text{in the case of single-acting engines of the 4 cycle type,}$$

$$= \frac{N \times D^2 \sqrt{S}}{40} \quad \text{in the case of single-acting engines of the 2 cycle type, and}$$

$$= \frac{N \times D^2 \sqrt{S}}{20} \quad \text{in the case of double-acting engines of the 2 cycle type,}$$

where D = diameter of cylinder in inches,

S = stroke of piston in inches in ordinary reciprocating engines,

= twice the stroke of piston in the case of engines of the "Junker" type,

N = number of cylinders.

For the survey and testing of steam boilers fitted in Diesel Engined vessels additional fees will be charged in accordance with the Society's usual scale.

3. For the survey and testing of each Donkey Boiler in steam-engined vessels, a fee of two guineas will be charged.

4. No charge will be made for occasional or docking surveys, or for surveying repairs consequent on ordinary wear and tear, at ports in the United Kingdom.

For the survey of damage repairs essential to the continuation of class (whether a special damage report be required or not), for surveys with a view to the re-instatement of class, and for the survey of alterations in the structure of a vessel, a fee will be charged according to the nature and extent of the services performed.

For all surveys held at Foreign ports a fee will be chargeable according to the nature and extent of the services rendered.

5.

SPECIAL PERIODICAL SURVEYS, Nos. 1, 2, and 3.

For the special periodical surveys of Iron and Steel Vessels, when such surveys are held by the Society's exclusive Surveyors in the United Kingdom.

	For Vessels under	150 tons gross	S.S. No. 1.		S.S. No. 2.		S.S. No. 3.	
			£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
" "	200	"	1 0	1 10	1 10	1 10	3 0	3 0
" "	250	"	1 10	2 0	2 0	2 0	3 10	3 10
" "	300	"	2 0	2 10	2 10	2 10	4 0	4 10
" "	400	"	2 10	3 0	3 10	3 10	5 0	5 0
" "	800	"	3 0	3 10	4 0	4 0	6 0	6 0
" "	1,200	"	3 10	4 0	4 10	4 10	7 0	7 0
" "	1,800	"	4 0	4 10	5 0	5 0	8 0	8 0
" "	2,500	"	4 10	5 0	5 10	5 10	9 0	9 0
" "	3,500	"	5 0	5 10	6 0	6 10	10 0	10 0
" of	3,500	" and above	6 0	6 0	7 0	7 0	10 0	10 0

SPECIAL PERIODICAL SURVEYS OF MACHINERY.

Held at the Special Surveys, Nos. 1, 2, and 3.

For each Ship under 50 nominal HP.	...	...	...	...	£2 0 0
" " 75 "	...	...	...	...	2 10 0
" " 100 "	...	...	...	...	3 10 0
" " 150 "	...	...	...	...	4 0 0
" " 200 "	...	...	...	...	4 10 0
" " 300 "	...	...	...	...	5 0 0
" of 300 "	and above	...	...	...	5 10 0

SPECIAL ANNUAL SURVEYS OF BOILERS.

To be held when and after the Boilers are six years old.

For each Ship having 1 boiler	...	...	...	...	£1 0 0
And for each additional boiler (including the donkey boiler)	...	...	...	...	0 10 0
But the fee in no case to be more than	...	...	...	...	3 0 0
For survey of donkey boiler of sailing vessels	...	...	...	...	1 0 0

6. For Surveys for Restoration, Continuation, or the character A in Red, and in cases where the caulking of ships is superintended and tested by the Surveyors a charge will be made according to the nature and extent of the services rendered.

7. All repairs which may be required on the Surveys above referred to, must be performed under the superintendence of the Society's Surveyors. (*See also* Section 22.)

8. In all cases where travelling expenses are incurred by the Surveyors in connection with the above services, they are to be defrayed by the parties interested in the same.

Section 30. The class of a vessel is liable to be withheld, or, if already granted, may be withdrawn or expunged from the Register Book in the case of non-payment of any fees or expenses chargeable on account of such vessel.

Section 31. Certificates of Classification, signed by the Chairman, Deputy-Chairman, or Chairman of the Sub-Committee of Classification, and countersigned by the Secretary, will be granted on application.

FREEBOARD.

Section 32. Fees for the Survey for, and assignment of, Freeboard.

			Classed Vessels,	Unclassed Vessels.
For Vessels under 300 tons gross	...	...	£1 1 0	£ 2 2 0
" " of 300 tons and under 1000 tons gross	...	...	2 2 0	3 3 0
" " 1000 "	2000 "	...	3 3 0	5 5 0
" " 2000 "	3000 "	...	4 4 0	6 6 0
" " 3000 "	4000 "	...	5 5 0	8 8 0
" " 4000 "	and above	...	6 6 0	10 10 0

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LLOYD'S REGISTER OF SHIPPING.

RULES FOR WOOD VESSELS.

1916.

THE SOCIETY OF MARITIME SURVEYS
NETS AND CO. JAWA AND THE SO. CHINAYE
RULES
FOR
THE BUILDING AND CLASSIFICATIONS OF WOOD VESSELS.

CHARACTERS.

Section 31. 1. The characters assigned to ships to be, as nearly as possible, a correct indication of their real and intrinsic qualities,* and to be in all cases fixed (not by the Surveyors), but by the Committee, after due consideration of the reports of the Surveyors, and such other documents as may be submitted to them, and will be distinguished as follows :—

SHIPS CLASSED A.

2. To consist of new ships, or ships Continued, or Restored. (*See Sections 34, and 54 to 59.*)

SHIPS CLASSED A, in Red.

3. To consist of ships which have passed the period assigned on the original Survey, or Continuation, or Restoration, and of ships not having had an original character, provided they are found on survey of superior description, fit for the conveyance of dry and perishable goods. (*See Section 60.*)

SHIPS CLASSED A.

4. To consist of ships which are found on Survey fit for the safe conveyance of dry and perishable goods, on *short voyages*. (*See Section 61.*)

SHIPS CLASSED E.

5. Will comprise ships which shall be found on Survey fit for the conveyance of cargoes not in their nature subject to sea damage. (*See Section 64.*)

6. To entitle sailing ships to the Figure 1 for equipment, Sections 72 to 76 must be conformed to and stores supplied in accordance with Tables 30 and 31, attached to the Rules. (*See also Section 32.*)

7. For steam vessels see Section 35.

* Ships which are not built in accordance with the principles of the Society's Rules will be marked in the Register Book thus "[Expl. B.S.]," denoting that they are built experimentally, and are classed subject to being surveyed biennially.

EXPUNGING OR WITHDRAWAL OF CHARACTER.

8. The fifth, sixth and seventh Columns of the Register of Steam Vessels, and the sixth, seventh and eighth columns in the Register of Sailing Vessels, left blank, indicate that the Vessel has never been Classed in the Register Book.

9. The efficient state and condition of the whole of a vessel's equipment will be designated by the figure 1 placed after the character assigned to the vessel; and in cases in which the equipment is found insufficient in quantity or defective in quality, a dash, thus —, will be inserted in place of the figure 1.

10. When the rules as regards surveys on the hull, machinery or boilers of a steam vessel, or on the hull, masts, spars, or rigging of a sailing vessel have not been complied with, so that the vessel is not entitled to retain her class in the Register Book, the character will be expunged with a red line, under which the date of such withdrawal of class will be recorded.

11. When it is found from *reported defects* in the hull, machinery or boilers of a steam vessel, or in the hull, masts, spars or rigging of a sailing vessel, that the vessel is not entitled to retain her class in the Register Book, the character will be expunged with a black line, under which the date of such withdrawal of class will be recorded.

12. When the class of a vessel is withdrawn from the Register Book by the Committee in consequence of a request from the Owner, the fact will be indicated by the insertion of three dots (...) in column 7 of the Register of steam vessels and column 8 of the Register of sailing vessels.

TONNAGE FOR REGULATING THE SCANTLINGS AND EQUIPMENT (AS REGARDS ANCHORS, CHAINS, &c.) OF WOOD VESSELS.

Section 32. 1. In flush-decked vessels having either one, two, or three decks (not being spar or awning-decked), the tonnage under the upper deck, *without abatement of the tonnage of the space for the crew, or for the propelling power of steam vessels*, is to regulate all the scantlings of the hull, and also the equipment of the vessel, as regards anchors, chains, warps, &c.

2. In vessels having a *raised quarter deck*, or a poop, or top-gallant forecastle, or deck houses, an awning deck, or spar deck, the total tonnage below the tonnage deck is to regulate the scantlings of the hull, but the register tonnage, as cut on the main beam of sailing vessels and of steam vessels, *with the addition of the tonnage of the space required for propelling power*, is to regulate the equipment.

3. But in vessels where the tonnage of the erections above the tonnage deck is less than that allowed for crew space, *then the difference* between the tonnage of these erections and the tonnage of the space allowed for crew is to be *added* to the register tonnage, cut on the main beam, for the tonnage that is to regulate the equipment. (*See also Section 72, page 60, and Tables 30 and 31.*)

RULES FOR CLASSIFICATION.

SHIPS CLASSED A.

Section 33. 1. Will consist of new ships, and ships which have not passed a prescribed age, and also those which have a Continuation or Restoration of that character, provided they are kept in a state of complete repair and efficiency.

2. The Character A will not be granted to any vessel unless satisfactory evidence of the date, build, and place where built, is produced. (*See Section 59, foot-note.*)

Section 34. 1. The number of years to be assigned for Character A is to be determined with reference to the original construction and quality of the vessels, the materials employed, and the mode of building : and their continuance for the time so assigned to depend upon its being shown by occasional surveys (annually, if practicable) that their efficiency is duly maintained. (*See N.B. at foot.*)

2. Defects in workmanship or quality of timber will involve a reduction of Class, to be determined by the Committee in each case.

HALF-TIME OR INTERMEDIATE SURVEY.

3. The Characters of ships classed A, or A in red, will be struck out of the Register Book unless they be submitted to the following intermediate survey, within periods not exceeding four years in the case of vessels classed from six to eight years inclusive, either originally, or on Continuation, or on Restoration, or A in red, and within periods not exceeding half that assigned in vessels classed for longer terms. Vessels classed for a less period than the above will not be required to undergo such half-time survey.

4. The survey will be noted in the Register Book thus,—“HT” (half time), with the date of the survey affixed.

SURVEY.

5. The ship to be placed on blocks in dry dock, or on ways, so that the keel and bottom may be seen and properly examined (unless she has been thus surveyed by the Society's officers within the previous twelve months) ; the hold to be cleared, and proper stages made both inside and outside ; the limbers, and all air courses to be cleared ; and if the ship has not already got the air courses, described in Section 37 of the Rules, they are now to be made ; the outside planking to be scraped bright where the Surveyors may consider it to be necessary from any apparent defect ; bolts of lower deck (if of iron) in number not less than six on each side, and treenails in number not less than twelve on each side, to be driven out at various parts of the ship.

6. The attention of the Surveyors is to be then particularly directed to the state of the upper or main deck and coamings, the upper and lower deck bolts, *whether of iron or copper*, and the outside planks through which they pass, and to all other parts of the ship, so far as they can be examined.

7. All yellow metal bolts to be tested where practicable, to ascertain if any are broken.

8. The windlass to be unhung and its wood lining sufficiently stripped for examination ; the hatches are to be examined in position at the hatchways, and if defective, are to be renewed or made good ; the steam steering engine, its connections, the steering rods, chains, blocks, rudder quadrant, tillers, and steering gear to be carefully examined and the condition of the various parts to be stated by the Surveyor on his report of survey ; the condition of the caulking is also to be ascertained.

N.B.—In reference to the Rules above quoted, and in order to prevent the disappointment arising from Ships losing their Characters from want of survey, it is hereby intimated that the duty of giving NOTICE OF PERIODICAL SURVEYS required by the Rules, or when repairs are necessary in consequence of damage, or from other causes, rests with the Owners, Masters, or Agents.

9. The cables to be removed from the lockers and ranged, and, with the anchors, masts, spars, and general equipment, examined so as to be satisfactorily reported on.

10. In the case of vessels allowed an additional year in classing for salting under Section 37, the state of the salting throughout such vessels is to be ascertained and reported upon at the Half-time Survey, and, if necessary, the salt is to be renewed. (*See* Section 37 as regards beams not salted.)

SHIPS BUILT WITH MIXED TIMBER MATERIALS.

11. Ships built with Mixed Timber Materials below the fourteen years' grade, of superior workmanship, and in which *high* class materials and extra fastenings have been judiciously employed to such an extent as to satisfy the Committee, may be allowed a period of original designation exceeding that to which the material of the lowest class used would otherwise entitle them, such additional period not to exceed two years.

12. Builders seeking this advantage must, in the first instance, submit, for the Committee's approval, a drawing of the midship section, with full details of construction and of the proposed materials and scantlings, through the resident Surveyor, who is to state to the Committee his opinion thereon, and the ship must be built under special survey.

13. No vessel already built, however, can have the advantage of the above rule, except a Special Survey be held on her to determine her claims thereto.

14. The highest (unless of a very limited quantity) and the lowest grade timber materials used in the construction of such Ships will be inserted in the Register Book.

See Sections 57 and 58 as regards application of this Rule to ships surveyed for Restoration.

SURVEYS WHILE BUILDING.

SPECIAL SURVEY.

Section 35. 1. The Surveyors are to examine, during the progress of a vessel, the materials and workmanship, from the laying of the keel to her completion; and to point out as early as possible anything that may be objectionable, or that is not in accordance with the Rules, or with the plans approved by the Committee for the particular vessel.

2. Vessels built under the Special Survey of the Society will be entitled to the distinctive mark **+**.

3. In steam vessels built under Special Survey, the Machinery and Boilers must also be constructed under Special Survey. (*See* Rules for Machinery.)

4. In steam vessels the machinery and boilers are to be inspected throughout construction, the boilers tested by hydraulic pressure, and the machinery tested under steam. Machinery certificates will be granted, and notifications thereof made in the Register Book, thus: "LMC 6,16" *in red* (*i.e.* LLOYD'S MACHINERY CERTIFICATE, June, 1916).

5. In cases of machinery or new boilers being built under Special Survey, the distinguishing mark **+** will be noted in red, thus: "**+**LMC," or "**+**NE&B," or "**+**NB."

6. In cases in which the machinery or boilers are of novel description, or in which experience has not sufficiently shown the safety of the principle or mode of application involved, the words "Machinery Experimental," or "Boiler Experimental," will be inserted under the class of the vessel in the Register Book; but if in the opinion of the Committee the machinery or boilers are so far inefficient as to imperil the vessel's safety, no class will be assigned.

7. If the hull of a steamer has been built in accordance with the Rules, a provisional certificate will be issued, if desired, stating the class to which the vessel will be entitled when the machinery and boilers have been fitted on board in accordance with the Rules, and the Committee's requirements otherwise complied with.

8. For requirements relating to the survey and construction of engines and boilers, *see* Rules for Machinery.

NOT UNDER SPECIAL SURVEY.

9. New ships not building under Special Survey are to be surveyed by the Surveyors to this Society, in the following three stages of their progress, or they will be liable to lose one year of the period to which they might otherwise be entitled. (*See* Section 53.)

First. When the Frame is completed, timbers dubbed fair inside and outside ready to receive planking and before any planking is wrought.

Second. When the beams are put in, but before the Decks are laid, and with at least two strakes of the plank of the ceiling between the lower deck and the bilge unwrought, to admit of an examination of the inner surface of the plank of the bottom.

Third. When the Hull is completed, and before the plank is painted or payed.

10. All ships for which a higher character than Ten Years A may be claimed, must be surveyed by an exclusive Officer of the Society, twice at least while building—namely, at the first and at the second stage of their progress as above prescribed. Due notice must be given by the Builder or Owner of their being ready for these surveys.

Section 36. A full statement of the dimensions, scantlings, &c., of all New Ships, verified by the Builder, is to be transmitted by the Surveyor, on a First entry report form, which is to be kept as a record in the office of the Society.

RULES TO BE OBSERVED IN BUILDING SHIPS.

Section 37. 1. The whole of the timber is to be of good quality and properly seasoned, and of the descriptions shown in Table A, as applicable to the several terms of years for which ships may respectively be appointed to remain on the Character A.

2. In ships claiming to stand twelve or fourteen years from their timber materials, the stem, stern-post, beams, transoms, apron, knightheads, and keelsons, are to be entirely free from sap and from all defects. The rest of the frame to be well squared and free from sap.

SALTING.

3. One year for salting will be added to the term of classification to which a ship may otherwise be entitled, provided that *during her construction* the openings between the timbers of the frame, at the extremities of the vessel, from the deadwood to the height of the air-courses formed midway between the keelson and the hold beam clamps, and also the buttocks, be filled with salt, and the spaces between the upper air-course and the gunwale be filled before the planksheer is fitted; and that, *within six months of the date of launching*, the salting be completed so as to fill the spaces between the transoms and between the timbers of the frame at each end of the vessel for one-fifth her length, from the deadwood to the gunwale, and amidships from the upper part of the bilges to the gunwale, to the entire satisfaction of the Surveyor. For the purpose of retaining the salt between the timbers, stops are to be introduced immediately above all the air-courses and at the upper part of the bilges.

4. The keelson is also to be cased in and salted all fore and aft, excepting in vessels of 200 tons and under, when it will only be required to be cased in and salted for one-fifth of the vessel's length at each end.

5. In the case, however, of vessels entitled in other respects, from their wood materials, to a class not higher than 10 A, where the keelson is composed of *materials named in lines Nos. 1 and 2 of Table A*, it will not be necessary to salt the keelson, except at the ends.

6. The beams on which the weather-deck is to be laid, if salted, are to have a groove gouged on their upper side, except at their extreme ends; the groove to be in width not less than one-fourth the siding of the beam, and one inch in depth, and to be filled with salt as the deck is being laid; but, if not so salted, the beams, *when of wood of the nine years' grade and under*, of all ships to which a year has been or may be granted for "Salting" must, on the occasion of Half-time Survey, be exposed for examination by the removal of deck planking to the extent of one stave all fore and aft at each side of the ship, or to the satisfaction of the Surveyor.* (See Section 34.)

7. The state of the salting throughout such vessels is to be ascertained and reported upon at the Half-time and other Special Surveys, and, if necessary, the salt is to be renewed.

Mem.—The foregoing Rule is not to apply to ships built entirely of Teak.

For application of this Rule in repair of ships under the Second Rule for Restoration, see Sections 57 and 58.†

WORKMANSHIP.

8. The workmanship in vessels is to be well executed, and equally so for all grades.

9. Each set of timbers to be frame-bolted together throughout their entire length; the butts of the timbers to be close, and not to be less than one-third of the entire moulding at that place.

10. In *all* ships building for classification, where the heads and heels are not full moulded, the timbers are to be well cross-chocked with a proper butt at each end of the chock, each arm to be not less

* In cases where the beams have not been salted as above prescribed, the notation† will be added to the record in the Register Book—thus, *Salted.*†

† In cases of ships undergoing large repairs (or in other cases), and where ships have not been salted during construction, provided they are opened out to such an extent that the above requirements can be satisfactorily complied with, special application may be made to the Committee, with a view to having the additional year for salting granted.

in length than once and a half the moulding of the timbers they connect; in all cases the chocks are to be of a description of wood equal to the best material required by the Rules for the timbers which they unite, excepting the floor-head chocks, which may be of the materials allowed by the Rules for first futtocks.

11. Where the timbers are scarphed, the scarphs to be of proper length and with a butt at each end, and, in cases where the heads and heels of the timbers which come together are full moulded, a dowel (to be of the diameter from one-fourth to one-third of the moulding of the timber) must be introduced into the ends of such timbers in order to connect them; in the case, however, of vessels of 150 tons and under, provided the heads and heels of the frame timbers be otherwise properly secured to each other, dowels may be dispensed with.

AIR-COURSES.

12. In all ships an air-course must be left all fore and aft, either immediately below or one strake below the clamps of each tier of beams; and, in addition, one or two tiers of air-courses must be left in the hold, between the keelson and hold beam clamp, for one-fifth the entire length of the ship at each end.

POOPS AND FORECASTLES.

Section 38. 1. In the construction of top-gallant forecastles, and poops, the timbers must be of the same materials as are required by Table A for the top-timbers of the frames of ships according to the several terms of years appointed for such ships to remain on the character A, all the said timbers to extend to the planksheer.

2. All the outside planking of top-gallant forecastles, and the sheerstrakes, planksheers, and spirketting of top-gallant forecastles and poops must be of the materials required by Table A for the topsides of the ship; and the shelf and clamps of poops and top-gallant forecastles may be of the same quality as those allowed in Table A for the shelf and clamp of the upper deck.

3. All the beams of top-gallant forecastles, and the mast beams, breast beams and transom beams of poops, to be of the materials required by Table A for the beams of the ship; the remainder of the beams and the waterway of the poops, and the remainder of the planking of poops and top-gallant forecastles may be of cedar, mahogany, Baltic or American red pine, pitch pine, larch, hackmatack, tamarac, or cowdie and rock-elm for such remainder of beams only, and yellow pine or American white spruce in ships below the seven years' grade.

4. In the inside and outside planking, waterways, planksheers, and flat of deck of full poops* and top-gallant forecastles, a reduction of *one-fourth* from the thickness required by the Table B for such planks in the range of the upper deck in ships with two decks, will be allowed; and, in the siding and moulding of the top-timbers and beams of full poops and top-gallant forecastles, a reduction of *one-fifth* will be allowed.

5. The united lengths of poop and forecastle are not to exceed three-fifths of the entire length of the upper deck.

* Parties desirous of making any alteration in the construction of Poops, with a view to diminishing the weight (but preserving the requisite strength), may submit their plans for the Committee's consideration and approval.

RAISED QUARTER-DECKS.

6. The materials required for the construction of raised quarter-decks to be of the same quality as those named in Table A for the main body of the ship.

7. In the inside and outside planking, waterways, plankshears, and flat of deck of raised quarter-decks, a reduction of *one-fifth* from the thickness required by the Table B for such parts in the range of the upper deck in ships with two decks, will be allowed.

SPAR DECKS.

8. In vessels having three decks or tiers of beams, where the space under the upper deck is to be used only for the accommodation of crew and passengers, or to enclose the engine openings of steam vessels, the scantlings are to be regulated as per Section 32.

9. The total depth of hold in spar-decked ships must not exceed thirteen-sixteenths, nor be less than twelve-sixteenths of the ship's extreme breadth.

10. In the construction of spar decks, the timbers must be of the same materials as are required by Table A for the top-timbers of the frames of ships, according to the several terms of years appointed for such ships to remain on the Character A.

11. If *all* the said timbers extend to the planksheer, their siding and moulding may be reduced one fourth at their heads; but, if only the *alternate* timbers run up to the top height, then a reduction of one-fourth only will be allowed in their moulding at their heads, and in that case there must be a perfect covering board worked all round the ship at the middle deck; and in all cases the middle deck must be a complete deck laid and caulked.

12. All the outside planking, and the sheerstrakes, plankshears, and spirketting must be of the materials required by Table A for the topsides of the ship; and the shelf and clamp may be of the same quality as those allowed in Table A for the shelf and clamp of the middle deck.

13. All the beams before the foremast, and the mast beams, hatch beams, and transom beam, must be of the materials required by Table A for the beams of the ship; and the remainder of the beams and the waterways of spar deck, and the remainder of the planking, may be of red cedar, mahogany, Baltic or American red pine, pitch pine, larch, hackmatack, tamarac, or cowdie; and, in ships below the seven years' grade, the same may be of yellow pine, American white spruce, or white cedar.

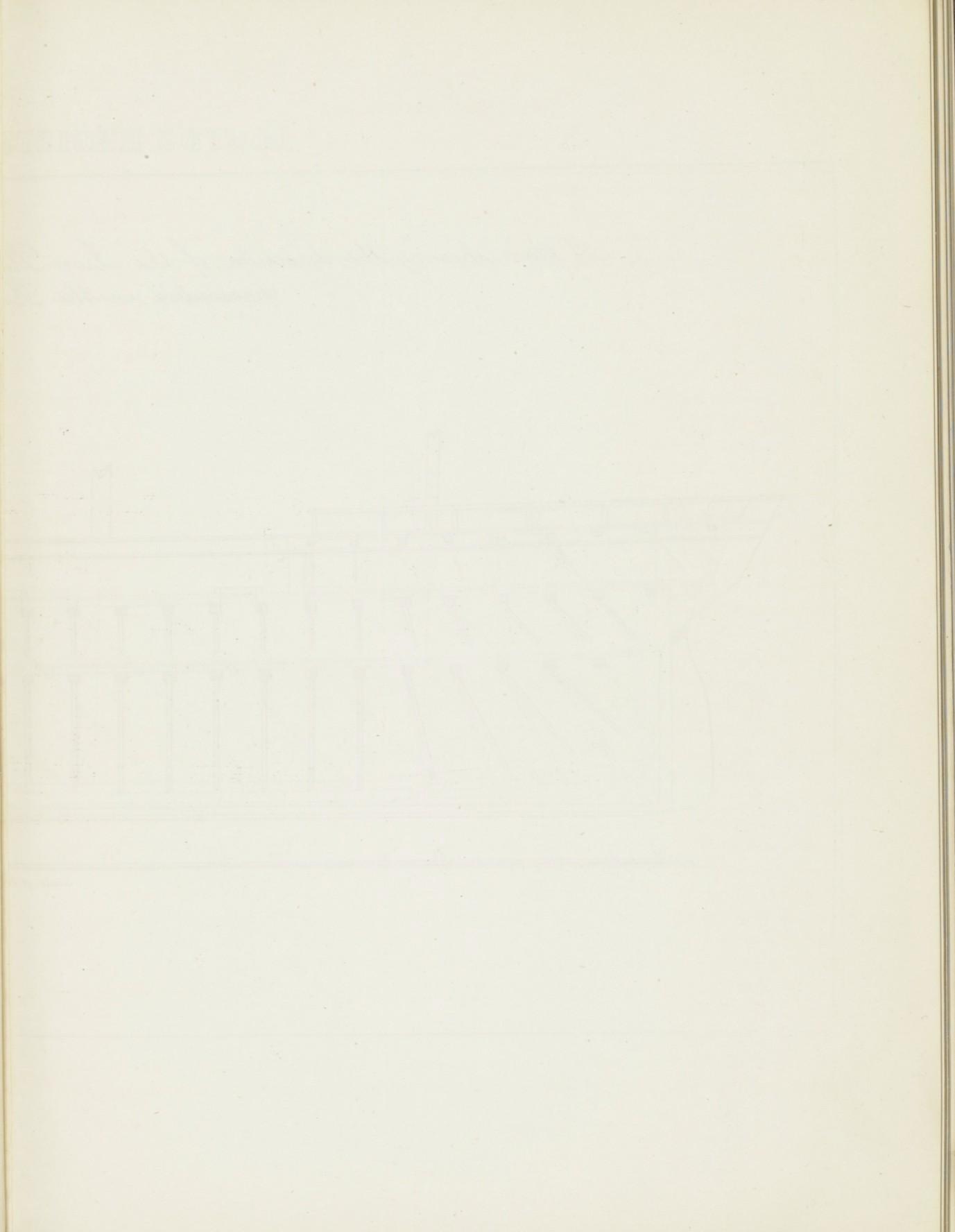
14. In spar decks there may be a diminution of *one-fourth* from the dimensions, fastenings, and bolts prescribed in the Tables for the upper deck of ships with two decks (except in the siding of the spar deck beams); but if the outside planking be of either 12 or 14 years' wood, then a reduction of *one-third* may be made in the thickness from that prescribed in Table B for the main sheerstrakes of such vessels.

15. Deckhouses or other erections are allowed on spar decks, but only to the extent of one-tenth of the total superficial area of the spar deck, and are not to exceed seven feet in height. They are not to be placed nearer to either of the ends than one-fifth of the entire length of the vessel.

16. Vessels to which this rule applies, as regards an entire spar deck, will be noted in the Register Book thus—“*Spar decked.*”

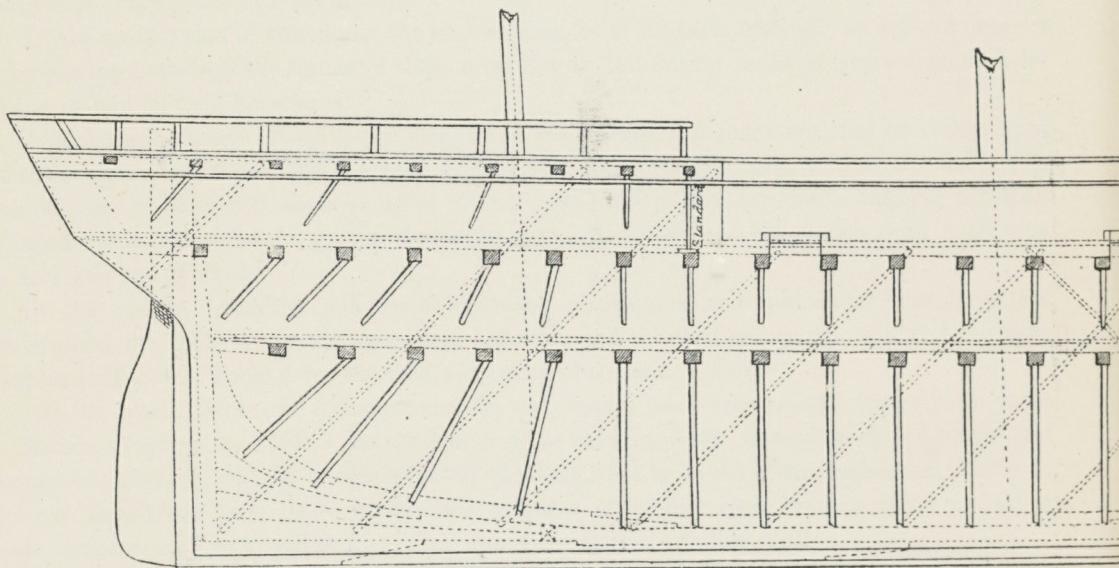
THREE-DECKED SHIPS.

17. All dimensions, fastenings, and bolts of the middle deck in vessels having three decks (viz., upper, middle, and lower deck), to be the same as those prescribed in the Tables for the upper deck of ships.



LLOYD'S REGIST

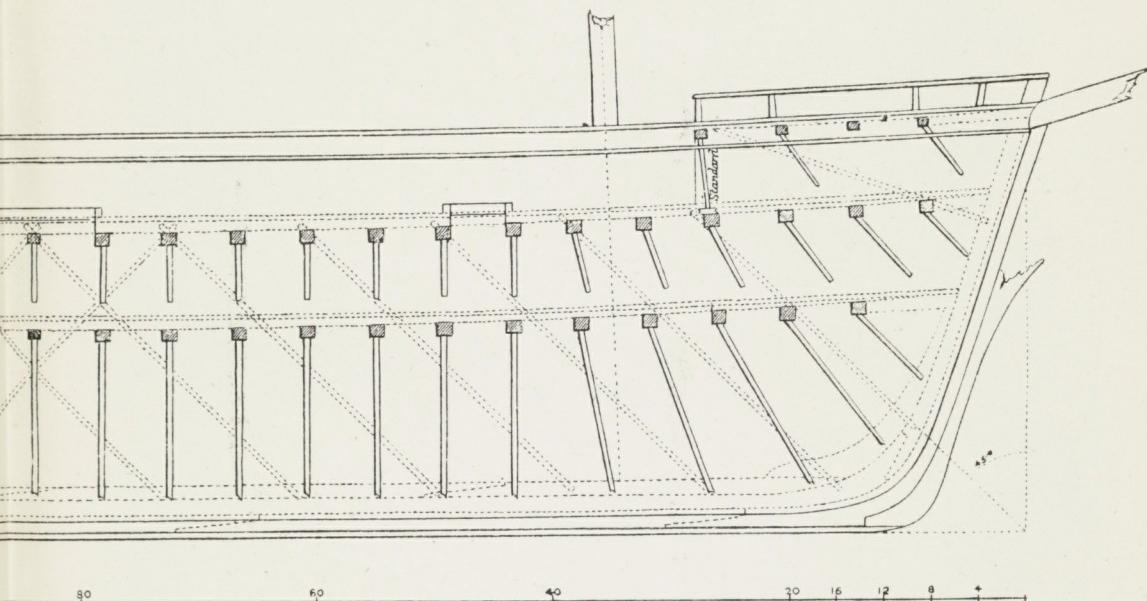
A plan shewing the direction of the Iron Plates
prescribed in the Rule

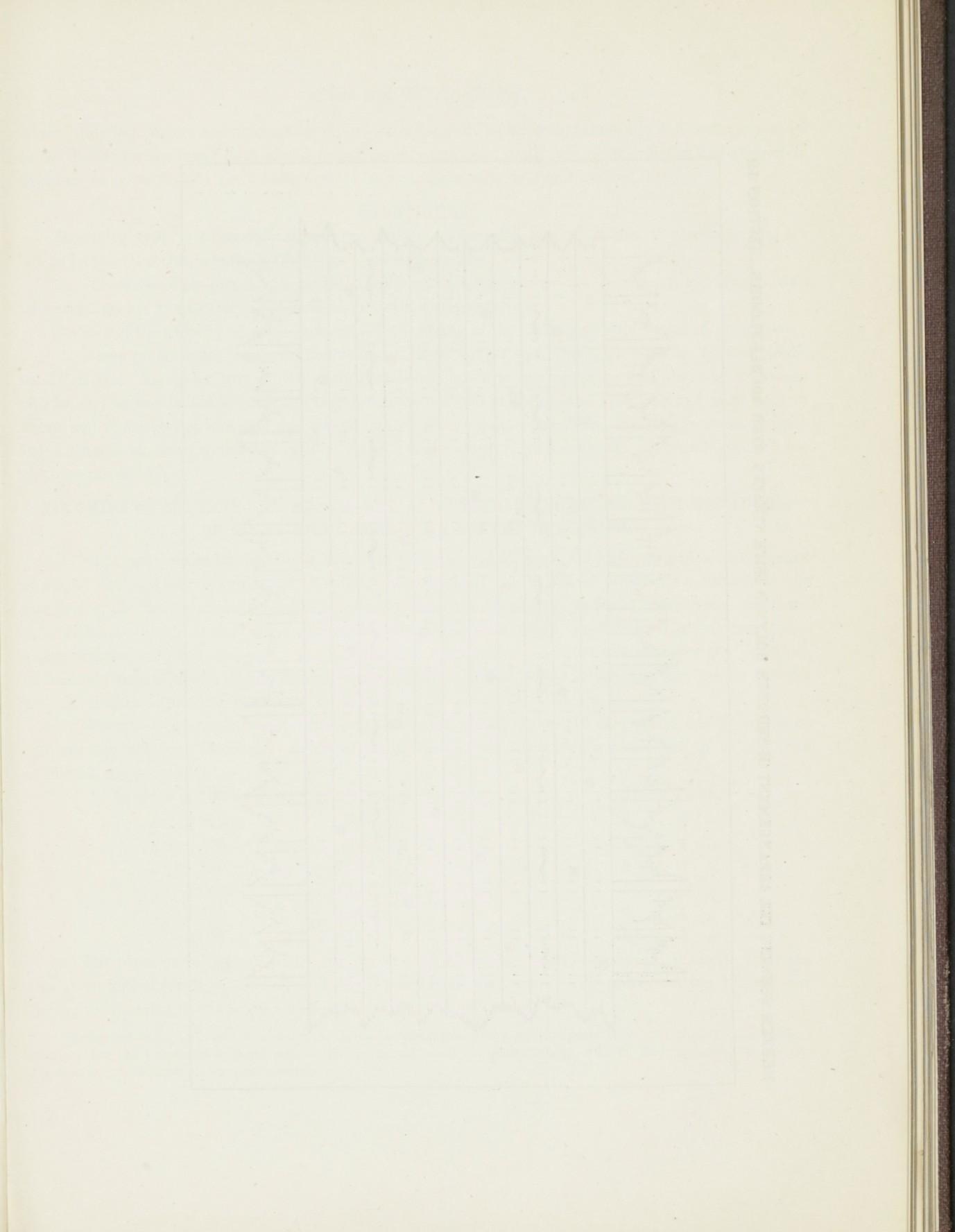


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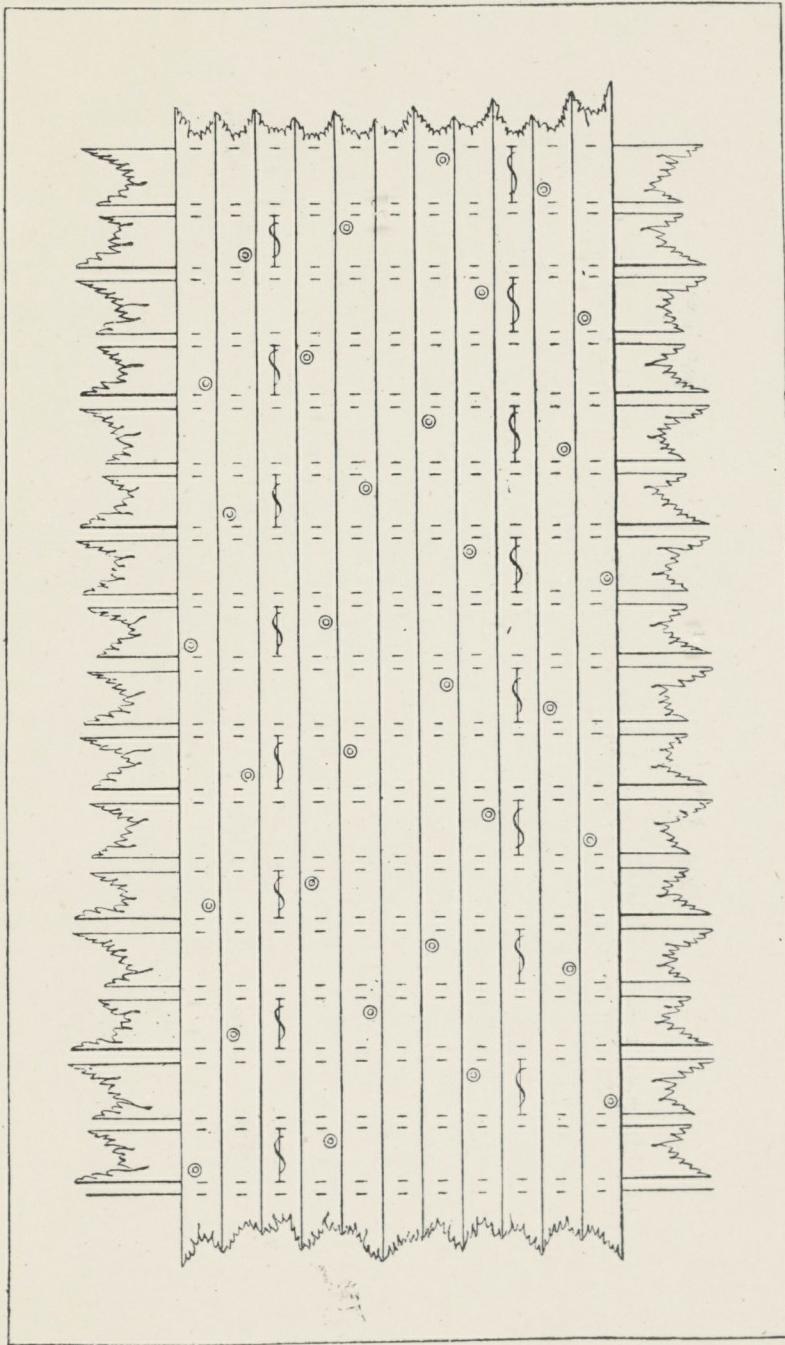
ER OF SHIPPING.

ates on Frames, and Iron Knees and Riders.
les. Sections 39 and 62.





SKETCH SHOWING THE ARRANGEMENT OF THROUGH BOLTS IN THICK STRAKES OVER DOUBLE FLOORS - SECTION 39



having only two decks; and a reduction of one-sixth from the dimensions, fastenings, and bolts prescribed in the Tables for the upper deck of vessels having only two (viz., upper and lower deck) will be allowed in the third or upper deck. The middle deck to be a complete deck, laid and caulked.

SCANTLINGS.

Section 39. 1. The Scantlings of the timbers, keelson and keel, thickness of planking, &c., are not to be less than those shown in Table B. (*See Section 32.*)

2. The intermediate dimensions for the scantling of timbers between the floor-heads and the gunwale to be regulated in proportion to the distance from the two points.

3. Should the timber and space be increased, the siding of the timbers to be increased in proportion.

4. Whenever ships are built with double floors, thick strakes (*see Table B*) must be worked inside, to extend from the lower part of the short floor-head chocks to the upper part of the long floor-head chocks, and be well bolted through and clenched, with one bolt at the head of each long and short arm of floors, and at the heel of each first and second futtock which comes upon them, from the foremast extending a distance aft equal to three-fifths of the length of the ship; in such cases, the limber strakes need not be through bolted.

FIR SHIPS OF 600 TONS AND ABOVE, AND ALL VESSELS EXCEEDING FIVE BREADTHS, OR EIGHT AND UNDER NINE DEPTHS IN LENGTH.

5. Ships built in the British North American Colonies, and all ships, the frames of which are composed of Fir, of 600 tons and upwards, and all ships (wherever built) the length of which (measured from the fore part of the stem to the after part of the stern-post on the range of upper deck) shall exceed *five* times their extreme breadth, or *eight* times and under *nine* times their depth, shall have diagonal iron plates closely inserted *outside* the frame.* The said plates to extend from the upper side of upper tier of beams to the lower part of chocks at first futtock heads amidships, and to the same perpendicular height forward and aft, measured from the lower part of the keel.

6. When ships are constructed with long and short armed floors, the said plates are to extend to half-way between long floor-heads and first futtock-heads; the sizes of the plates not to be less than as follows, viz.:—

In ships of 100 tons and under 200 tons	...	...	...	3½ by $\frac{7}{16}$ in.
„ 200 „ 400 „	...	...	...	4 „ $\frac{1}{2}$ „
„ 400 „ 700 „	...	...	...	4½ „ $\frac{5}{8}$ „
„ 700 „ 1,000 „	...	...	...	5 „ $\frac{3}{4}$ „
„ 1,000 „ 1,500 „	...	...	...	5½ „ $\frac{13}{16}$ „
„ 1,500 „ 2,000 „	...	...	...	6 „ $\frac{7}{8}$ „
„ 2,000 „ and above ...	...	...	...	6½ „ $\frac{7}{8}$ „

7. The plates to be fastened with bolts, one at each alternate timber, not less in diameter than the sizes given for "through butt bolts" in Table D; and to be well protected by proper coating, likewise the timbers to be coated in the scores which are to receive the said plates.

* Parties objecting to fit the iron plates on frames as prescribed above, are at liberty to submit, through the resident Surveyor, for the Committee's consideration and approval, such compensation as will, in their opinion, render the introduction of the iron plates unnecessary.

8. The number of plates to be in proportion of not less than one pair to every twelve feet of the ship's entire length taken as above, but not to be more than eight feet asunder measured on a square; the said plates are to be placed diagonally, at an angle of not less than 45 degrees, their lower ends pointing to the after end of the keel in the after body, and to the fore end of the keel in the fore body, four pairs crossing each other amidships.

9. All such ships are to have shelves and waterways to each tier of beams, each equal in contents to the transverse sectional area of the beams at their respective ends, as given in Table C. The breadth or faying surface of shelves and waterways to the beams must not be less than the siding given for the beams of the several decks.

10. The shelves and waterways are to have the beam ends either doweled or dovetailed to them, and they are to be properly shifted and scarphed; if fastened with copper or yellow metal, to be bolted through the outside planking at every timber with bolts of the sizes given in Table D. The upper deck binding bolts in all cases to be driven through the outside planking.

11. When the bolts of the hold or lower deck waterway, shelf, spirketting, or clamp, are of *iron*, they may be driven through and clenched on the timbers of the frame, or from the frame and clenched on the waterway, shelf, spirketting, or clamp.

12. A hanging-knee to be also fitted to the lower side of every beam end. In such cases lodging-knees may be dispensed with, except in the mast-rooms.

13. In addition, vessels of 200 tons and above are to have an *inner waterway* fitted on the beams of the upper deck, to extend amidships for about three-fourths of the vessel's length. It may be composed of East Indian teak, pitch pine, larch, hackmatack, Dantzig, Memel, Riga, or American red pine, for vessels of any class.

14. The breadth of the inner waterway amidships is to be not less than the siding required for the beams, but it may be reduced in breadth at its extreme ends, and the thickness above the beams is to be not less than once and a half the thickness required by Table B for flat of deck. The inner waterway is to be in and out through bolted at alternate timbers; and, if its breadth shall exceed six inches, it is to have two vertical through bolts in each beam end.

15. The shifts of inside and outside planking are not to be less than six feet, unless there be a strake wrought between them, and then a distance of five feet will be allowed.

VESSELS EXCEEDING SIX BREADTHS OR NINE AND UNDER TEN DEPTHS IN LENGTH.

16. In vessels the length of which shall exceed *six* times their extreme breadth, or *nine* times and under *ten* times their depth, the number of plates must be not less than one pair to every *ten* feet of the ship's entire length taken as above, but not to be more than six feet asunder measured on a square, and to be placed diagonally as before described in this Section.*

17. And in addition to the requirements for ships of five times their breadth in length such ships must be fitted with a rider keelson, or a pair of sister keelsons, at the option of the Owner, the transverse sectional area of such rider keelson or sister keelsons each to be equal to two-thirds of that required in Table B for main keelsons.

* In cases where the length of the ship exceeds ten times the depth, the Builders or Owners are to submit through the resident Surveyor, for the Committee's approval, their plans for giving the vessel the necessary strength longitudinally.

18. If a rider keelson be adopted, it is to be fastened with a through bolt (of the size required in Table D for keelson bolts), in every frame; or, if the Owner prefers it, every intermediate bolt may be short, passing only through the main and rider keelsons.[†]

19. If sister keelsons be fitted, they must be fastened with through bolts, in number not less than one in every alternate timber, and of the size required in Table D for "scarphs of keels," &c.

BEAMS.

Section 40. 1. The sizes of the deck and hold beams have been regulated so as to be determined by the length of the beams *amidships*, as shown in Table C. The beams will be required to be of the size of the midship beam, except those at the *after end* of the ship, which may be reduced in proportion to their length.

2. If beams of spruce or yellow pine are used, the siding of such beams shall be one-fourth larger than is prescribed by the above Table, or be increased each way, siding and moulding, equal in area to that amount.

IRON BEAMS.

3. In cases where Iron Beams are fitted in Wood Ships the beams of the upper deck are to be one sixteenth of an inch thicker than is required by the Rules for ships built of Iron, in consequence of the greater space between; and the lower deck or hold beams are to be one-eighth of the depth deeper, and one sixteenth of an inch thicker, than the upper deck beams. The spaces between beams of the several decks not to exceed the spaces at present allowed for wood ships, as per Rule, Section 41. Each tier of beams must have stringer plates riveted on their ends, and tie plates fore and aft, on each side of the hatchways.

4. Parties are to submit, through the resident Surveyor, their plans for attaching Iron beams to the ship's sides, for the Committee's approval.

Section 41. 1. The beams of all decks to be in number and size as hereinafter specified, and to be securely fastened to the sides either with lodging-knees of iron or wood, or with a shelf-piece and waterways, as described in Section 39,[‡] or with a shelf-piece and knees, or with some other security equal thereto.

WATERWAYS AND SHELVES.

2. The depth of waterway required for faying surface against timbers, below the underside of the planksheer, is to be as shown in Table B, to receive in and out bolts at alternate timbers, with alternate through bolts in shelf, and in clamp where there is no shelf.

3. Where shelves and waterways are fitted, each should equal in contents the transverse sectional area of the beams at their respective ends, as given in Table C. The breadth or faying surface of shelves and waterways to the beams must not be less than the siding given for the beams of the several decks.

[†]In all cases in which a rider keelson is fitted, it must be fastened as prescribed above, irrespective of the relative dimensions of the ship.

[‡]When the shelves and waterways are fitted and bolted as described in Section 39, having also a hanging-knee to the lower side of every beam end, then lodging-knees may be dispensed with, except in the mast-rooms. In ships of 500 tons and under, where lodging-knees properly bolted are applied, the ordinary plank-clamps may be used, but the bolting of them at alternate timbers, as per Table B, cannot be dispensed with.

4. A hanging-knee to be also fitted to the lower side of every beam end. In such cases lodging-knees may be dispensed with, except in the mast-rooms.

5. The shelves and waterways are to have the beam ends either dowelled or dovetailed to them, and they are to be properly shifted and scarphed; if fastened with copper or yellow metal, to be bolted through the outside planking at every timber with bolts of the sizes given in Table D. The upper deck binding bolts in all cases to be driven through the outside planking.

6. When the bolts of the hold or lower deck waterway, shelf, spirketting, or clamp, are of *iron*, they may be driven through and clenched on the timbers of the frame, or from the frame and clenched on the waterway, shelf, spirketting, or clamp.

7. All vessels of 200 tons and above to have an inner waterway, as stated in Section 39.

8. All ships of 150 tons and above to have vertical knees to the DECK beams; and those of 200 tons and above to have vertical knees to the HOLD beams, in number as shown in Table E.

DEPTH OF HOLD FOR SPACING OF BEAMS.

9. In vessels of 13 feet and under 15 feet depth of hold, the spacing of the hold beams not to exceed 8 feet apart, and the deck beams 4 feet. Vessels of 15 feet and under 18 feet hold, the spacing not to exceed 8 feet and 4 feet apart alternately, or in that proportion; the deck beams to be placed one over every hold beam, and one in all double spaces. In vessels of 18 feet hold and above, the spacing of the beams not to exceed 4 feet 6 inches; the deck beams to be one over every hold beam.

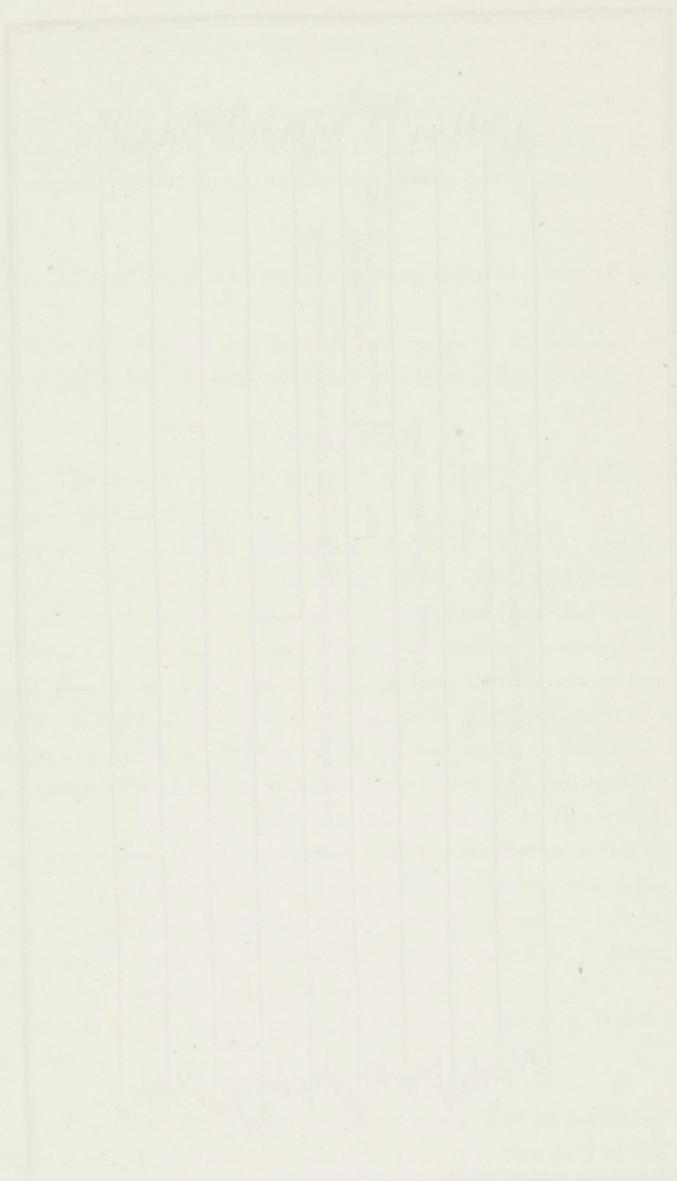
10. The depth in all such cases to be determined by taking the measure from the top of the limber strake (the thickness of which, for measurement, is to be taken as prescribed in Table B) to the top of the upper deck beams.

11. Ships having a depth of hold, measured from the limber-strake to the under side of the lower deck beam, above 13 feet but not exceeding 15 feet, must be secured with iron riders of the sizes, and be fastened, as shown in Table F, and in number not less than one on every fourth floor, on each side, from fore side of foremast to aft side of mizen-mast, to extend from the lower deck beams downwards so as to receive not less than two bolts in a substantial part of the floors; or by orlop beams, sufficient in number and properly secured.

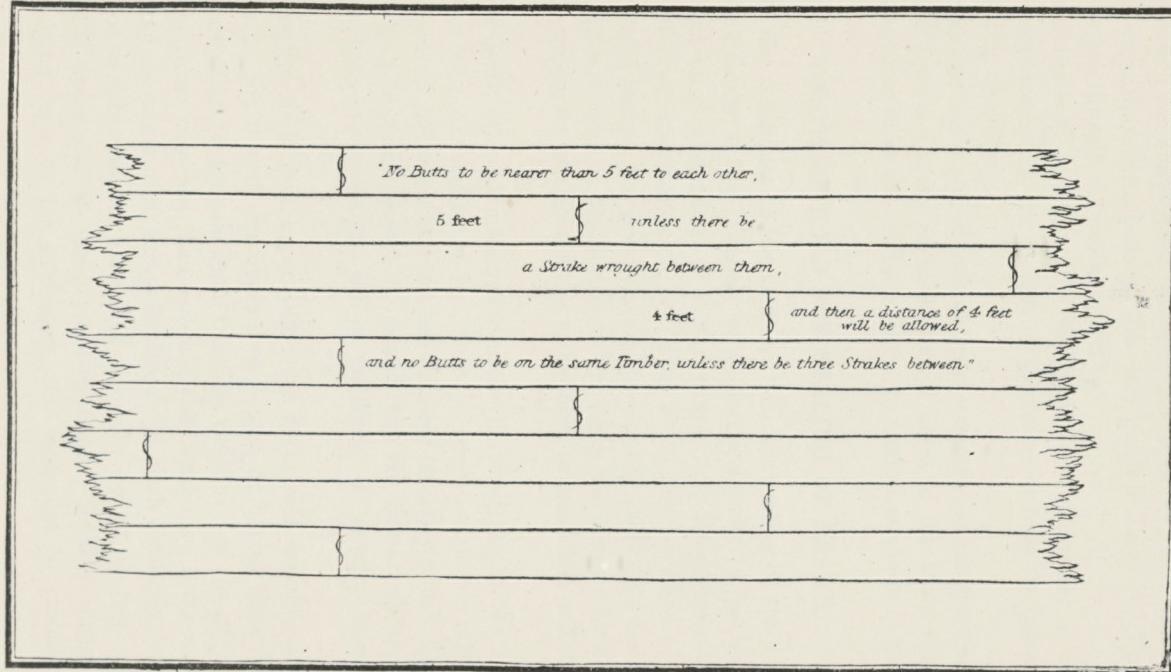
12. All ships having two decks (viz. upper and lower deck), and exceeding 24 feet in depth from the top of the limber-strake to the top of the upper deck beams, or having three decks (viz. upper, middle and lower deck), and exceeding 24 feet in depth from the under side of the MIDDLE DECK, to have orlop beams, the number to be in no case less than one-half the number of lower deck beams in the space between the foremast and the mizen-mast, except in the case of flush deck ships, when a depth of 25 feet will be allowed, provided in either case the lower hold does not exceed 15 feet, measured as above from the limber-strakes to the under side of the lower deck beam. Should a house be constructed on such flush deck ship for lodging crew or for store-room, the same not to extend within 10 feet of the sternpost.

13. The application of this Rule to British North American built ships, and Fir Ships, will not exempt them from the full operation of the Rule, Section 62.

14. Every ship exceeding 150 tons to have at least one crutch for the security of the heels of the



SKETCH DESCRIPTIVE OF THE REQUIRED SHIFTING OF PLANK.—Section 44.—(See also Section 39.)



The Sketch shows the principle on which the Butts should be arranged, so as to avoid Stepping, which is deemed bad Workmanship.

after timber of the frame; one pair of pointers in addition to a knee at each end of the wing transom to connect the stern frame with the after-body of the ship; and a transom over the heels of the stern timbers properly kneeed.

15. The heels of the cant timbers forward and aft to be stepped into the deadwood and bolted through.

16. All hatchways and mast holes to be properly framed to receive half beams where necessary, and to have mast partners to each tier of beams, except the orlop beams. The mast holes, skylights, and companions to be properly secured to the satisfaction of the Surveyors.

FRAME.

Section 42. 1. All timbers of the frame, including those of the poop and forecastle, to extend to the extreme height.

2. The shifts of timber in vessels of 200 tons and upwards to be not less than one-seventh of their main breadth; and, in ships under 200 tons, to be not less than one-sixth of their main breadth.

PLANKING.

Section 43. 1. The outside planking to be of good quality, of the description prescribed in Table A, to be clear of sap and free from all defects.

2. The inside planking to be of the description shown in Table A, and free from all foxy or druxy defects, and decayed knots. With regard to the ceiling plank, and the efficiency of its fastening, it will be required that the planking shall be properly shifted and fastened so that there shall be at least either treenails or through bolts, or short bolts, in each plank of the ceiling *in every timber*.

Section 44. 1. No butts to be nearer than 5 feet to each other (*see* Section 39, for vessels exceeding five breadths or eight and under nine depths in length), unless there be a strake wrought between them, and then a distance of 4 feet will be allowed; and no butts to be on the same timber, unless there be three strakes between, as more particularly shown in the diagram annexed (*see Plate*), but vessels under 200 tons will be exempted from the full operation of this rule; and in ships of larger tonnage a literal compliance with it will be dispensed with in cases wherein it may be satisfactorily proved that the departure from the rule is only partial, being confined to the ends of the ship, or the planking of the topside, and does not injuriously affect the ship's general strength; but such relaxation will not be sanctioned unless an accurate description of the shifting of the plank be transmitted by the Surveyors, to enable the Committee to form a proper judgment on the case.

2. The thickness of the plank, according to the tonnage of the ship, is not in any instance to be less than is prescribed in Table B.

BREADTH OF WALES.

Section 45. 1. The breadth of the wales in every case is to be regulated as under, viz:—

2. When the extreme length of the ship, measured from the fore part of the stem to the after part of the stern-post on the range of upper deck, is six times her depth of hold (or less), the wales are to be in breadth 3in. to every foot of the depth of hold.

3. When the extreme length of the ship is eight times her depth of hold, the wales are to be in breadth 3½in. to every foot of the depth of hold.

4. When the extreme length of the ship is ten times her depth of hold (or more), the wales are to be in breadth 4in. to every foot of the depth of hold.

5. And other intermediate dimensions in these proportions.

BILGE PLANKS.

6. The breadth of the bilge planks to be two-thirds that of the wales.

FASTENINGS.

Section 46. 1. Treenails to be of good quality, and of a description equal to the best material through which they pass.* If, however, in ships built in the British North American Colonies, or of Fir, treenails be used of materials not inferior to those comprised in line No. 2 in Table A, including Locust and all Australian and tropical hard woods of durable quality, and Beech in the bottom not higher than floor-heads, a notation of "*Hard Wood Treenails*" will be inserted against the ship's name in the Register Book.

2. The treenails are to be straight and circular, being either engine-turned, compressed, or planed, not graincut or knotty, and must be free from sap and tightly driven, and in all cases the treenails are to be efficiently caulked or wedged outside. In all cases in which planks above eleven inches in width shall be used, they must be double fastened; and those above eight inches in width must be treenailed double and single, except bolts intervene; and, if less than that width, then to be treenailed single.

3. Not less than two-thirds of the treenails are to be driven through the inside planking, clamps, &c.

4. Every butt in each outside plank to be fastened with *two* bolts, one of which may be in the adjoining timber, and one to be through and clenched.†

5. The bilges to be secured with bolts so placed that from the foremast, extending a distance aft equal to three-fifths of the length of the keel, there shall, in ships under 300 tons, be at least one bolt through and clenched in each first futtock; and that in ships of 300 tons and upwards there shall be at least two bolts through and clenched for each set of timbers in one or other of the thick bilge strakes; or the bilge planks may be secured as defined in *Paragraph 13* for EXTRA PERIOD ALLOWED FOR METAL FASTENINGS.

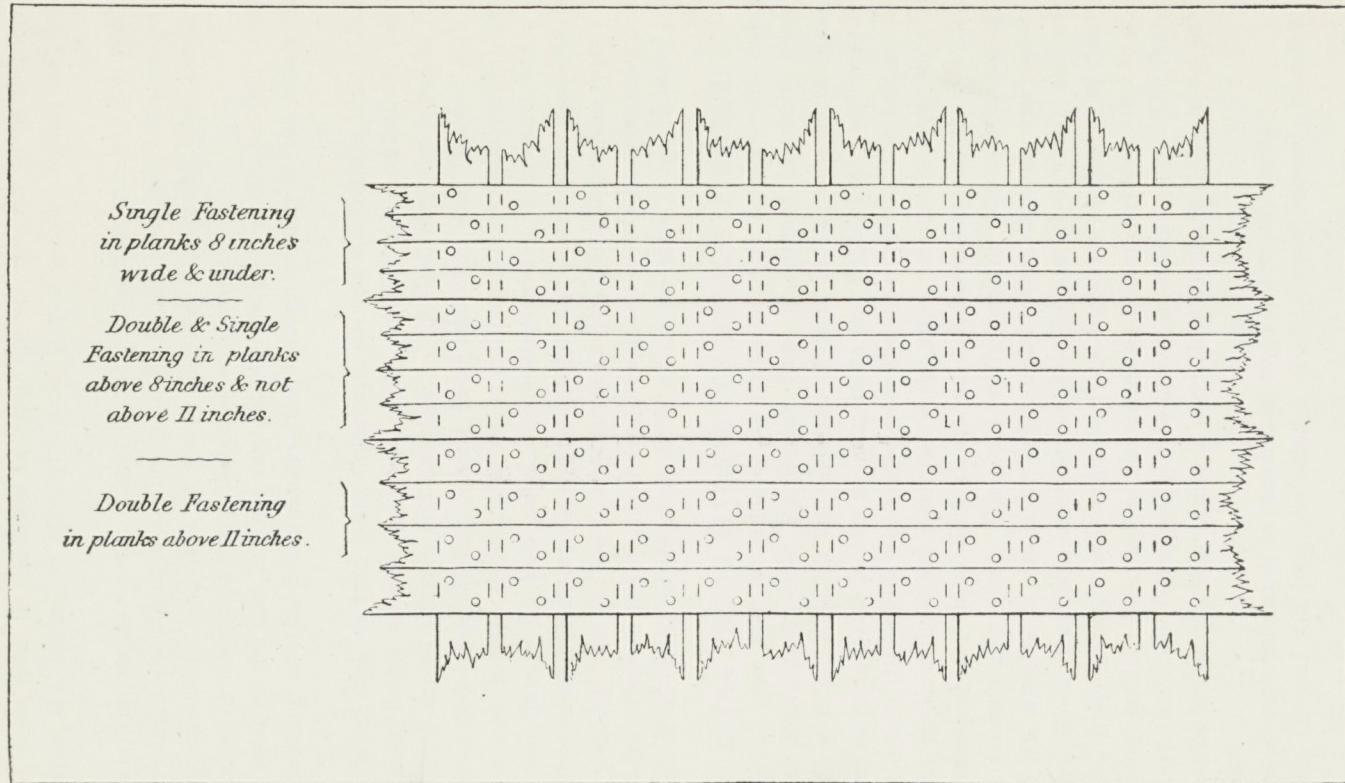
6. All the bolts of the knees, breast-hooks, crutches, riders, transoms, pointers, and keelsons, shelf-pieces, waterways, heels of timbers against fore and after deadwood, and of all other material fastenings, are to be driven through and clenched on rings of the same metal as the bolts. In vessels of 150 tons and under, where the keel is of American Rock Elm, or material of equally hard texture, and where the middle line bolts are of iron, they may be allowed to be driven one and one-half inch short of the underside of the keel, with a wood plug tightly driven against their ends.

7. In knees or knee riders vertically or diagonally fitted, the throat bolts in the side arms are to be placed as near as possible to (but not in) the angle of their throats, and the next bolt should not be at a greater distance than ten inches from the throat bolt, where practicable; also in the bolting of lodging or horizontal knees the same arrangement should be maintained, where the spacing of the timbers will admit of it. "*Jumped knees*" will not be allowed.

* Parties desiring a modification of this requirement must make special application to the Committee in each case.

† Where thick garboard strakes are used, they must be bolted horizontally through the keel and each other.

SKETCH SHOWING THE PROPER ARRANGEMENT OF TREENAILS OR BOLTS - SECTION 46.



8. The up and down bolts in the knees to beams are not required to be through the deck, but whether clenched upon the beams, or upon the deck, they must be clenched on rings of the same metal as the bolts.

9. The two bolts, the nearest to the crowns of the pintles and braces of the rudder, are also to be through and clenched, those through the braces to be in the main piece of stern-post.

10. The limber strakes to be bolted at every alternate timber, the bilge planks at every third timber, and the shelves or clamps at every timber *in each strake*.*

11. When the heels of the first futtocks meet at the middle line on the keel under the keelson (either with full moulding or with *butted* chocks) the through bolting of the limber strakes may be dispensed with.

12. When the lower deck or hold beam waterways, shelves, spirkettings, clamps and wood lodging knees, the bilge planks, limber strakes, and wood hooks, crutches and pointers, are fastened with iron, the bolts may be either driven through and clenched on the timbers of the frame, or from the timbers of the frame and clenched inside (if iron lodging knees are fitted and fastened with iron, the bolts must be driven from the inside), provided that the in and out bolts of the hanging-knees to the hold or lower deck beams, and those of the knee riders, iron hooks, crutches, or pointers, where such are fitted, are of copper or yellow metal driven through and clenched on the outside plank; and also one bolt in each butt of the bottom planking from the keel to one-fifth the depth of hold below the upper side of the upper deck, and parallel thereto forward and aft, be driven through and clenched on the ceiling, to be of copper or yellow metal, and, in addition, all the short bolts within the same range to be of copper or yellow metal.

EXTRA PERIOD ALLOWED FOR METAL FASTENINGS.

13. An additional year will be allowed to Ships of the A character, either on original Classification or on Restoration under the Second Rule, if fastened externally with treenails, and with copper or yellow metal bolts, to the exclusion of iron, in the outside planking, keel, keelson, deadwood, stem and sternpost, also in the hanging knees and riders, hooks and crutches (the bolts of which must pass through the outside planking), from the lower part of the keel up to the height of one-fifth the midship depth of hold, set down below the upper side of the upper deck at the side, and parallel thereto forward and aft; above which all external bolt fastenings, and the fastenings of the deck, may be of iron, if properly galvanized. The bolts in the heels of timbers abutting against the deadwood, forward and aft, must be of copper or yellow metal driven through and clenched on rings of the same metal; but the limber, bilge, *lower deck or hold beam*, shelf or clamp, and lodging-knee bolts, may be of plain iron, driven through, and clenched on the timbers of the frame, or from the timbers of the frame, and clenched inside. The whole of the remaining fastenings inside may be of plain iron. If iron lodging knees are fitted, their fastenings must be driven from the inside. The limber strakes to be bolted at every alternate timber, the bilge planks at every third timber, and the shelves or clamps at every timber in each strake.

14. In all cases through bolts must be clenched on rings of the same metal.

15. Vessels thus fastened will have the notation of cf. (copper fastened) recorded in the Register Book.

* Watercourses are to be properly formed at underside of all floors and futtocks at the limbers on each side of middle line so as to allow water to reach the pumps freely.

16. Two additional years will be allowed to ships of the A Character, either on original Classification or on Restoration under the Second Rule, if fastened externally with treenails, and with copper or yellow metal bolts or dumps, to the exclusion of iron, from the lower part of keel to the waterway inclusive, and the whole of the inside bolt fastenings, including fastenings of deck, frame bolts, and bolts in iron straps on timbers, and also the chain and preventer bolts, be of properly galvanized iron but the bolts in heels of timbers abutting against deadwood, forward and aft, must be of copper or yellow metal driven through and clenched on rings of the same metal. The limber, bilge, *lower deck or hold beam*, shelf or clamp, and lodging-knee bolts, may be of properly galvanized iron if driven through and clenched on the timbers of the frame, or from the timbers of the frame and clenched inside. If iron lodging-knees are fitted, their fastenings must be driven from the inside, but the whole of the bolts in the hanging-knees, riders, hooks and crutches, must pass through the outside planking and be of copper or yellow metal. The limber strakes to be bolted at every alternate timber, the bilge planks at every third timber, and the shelves or clamps at every timber in each stave.

17. Vessels thus fastened will have the notation of CF. (Copper Fastened) recorded in the Register Book.

18. Three additional years will be added on original Classification if, in lieu of treenails above the floor-heads, the whole of the planking is fastened with bolts of copper or yellow metal to the waterway inclusive, and the whole of the inside bolt fastenings, including fastenings of deck, frame bolts, and bolts in iron straps on timbers, and also the chain and preventer bolts, be of properly galvanized iron; but the bolts in heels of timbers abutting against deadwood, forward and aft, must be of copper or yellow metal *driven through and clenched on rings of the same metal*. The whole of the bolts in the hanging and lodging-knees, riders, hooks and crutches, must be through and clenched on the outside planking. In such cases of substitution the bolts must be in number the same as is already prescribed above for treenails; the proportion of through bolts must be at least two-thirds, and all the through bolts must be of malleable metal, and clenched on rings of the same metal inside.

19. The sizes of the copper or mixed metal bolts must be as under, viz. :—

In ships of 150 tons and under 200 tons	$\frac{5}{8}$ in.	Smaller sizes must not be used.
200 ditto	350 ,	...	...	$\frac{3}{4}$ in.
350 ditto	500 ,	...	...	$1\frac{3}{8}$ in.
500 ditto	700 ,	...	...	$\frac{7}{8}$ in.
700 ditto	900 ,	...	...	$1\frac{5}{8}$ in.
900 and above	...	...	...	1in.

and the lengths of the short bolts not less than as follows, viz. :—

When used in plank of $2\frac{1}{2}$ inches, to be 7 inches long.

3 ,	8 ,
4 ,	10 ,
5 ,	12 ,

and so on in proportion for plank of other thicknesses. The sizes of the bolts required in the several parts must not be less than is shown in Table D.

20. Vessels thus fastened will have the notation of CB (Copper Bolts instead of Treenails) recorded in the Register Book.

21. In British North American or Colonial built ships, and all ships wherever built, the frames of which are composed of Fir, in order to entitle them to the additional term proposed by these sections Nos. 1, 2, and 3, the rule with reference to "Salting" (Section 37) must in all cases have been complied with originally, or during repair under the Second Rule for Restoration.

Section 47. In every case where the butt bolts are not through and clenched, One Year will be deducted from the period which would otherwise be assigned in the classification of the vessel.

SHIPS BUILT UNDER A ROOF.

Section 48. Ships built under a substantial and efficient roof, kept in good repair, which shall project at each end beyond the length, and on each side beyond the breadth, a quantity equal to half the breadth of the vessel, shall have One Year added to the period prescribed, provided they shall have been surveyed whilst building, and shall have occupied a period of not less than twelve months in their construction, and in which no plank, except as follows, shall have been worked until the expiration of at least three months after the frame was completed, viz. :—not more than three strakes of bilge planks, and two strakes of outside plank in the way of each tier of beams, also the clamps inside, so that the beams may be put in their places.*

Section 49. The scantlings and dimensions for all sized vessels to be proportionately regulated, agreeably to Table B.

SHIPS CLASSED 11 A.

Section 50. Ships surveyed while building, in which *all the materials required for a Twelve Years Ship shall have been used*, and most of the other requisites for that grade fulfilled, but which, from partial deficiencies, may not appear to be in all respects entitled to the full period, although superior to the description of a Ten Years Ship, may be marked in the book thus, 11 A; thereby denoting that they are to remain on that grade *Eleven Years*, provided they be kept in a state of efficient repair.

SHIPS CLASSED 10 A.

Section 51. Ships surveyed while building, in which every *alternate* set of timbers is frame-bolted together throughout their entire lengths, and the scantling and shifts of the timbers, the thickness and shifts of the planks, and size of fastenings may be the same as are required by the Rules, and the description of materials prescribed in Table A shall also have been used, but in which the frame is not so well squared as is required for Twelve Years ships, but which shall be *in other respects* equal thereto shall be marked 10 A; thereby denoting that they are to remain on that grade for *Ten Years*, provided they be kept in a state of efficient repair.

Section 52. 1. In all other cases, ships surveyed while building, and constructed of the materials of good quality, hereinafter shown in Table A, will be allowed the several terms of years respectively appointed, provided they be kept in a state of efficient repair.

* In ships not exceeding 400 tons, a relaxation of the period herein required may be allowed (but not exceeding four months) provided application be made to the Committee, who will appoint a Special Survey, and who will require a report of the date when the timber was felled, its condition after being sanded and moulded and stacked for seasoning, and also when in frame.

SHIPS NOT BUILT UNDER SURVEY.

2. All Ships not built under Survey, whether in the United Kingdom or abroad, for which a character may be claimed, must be placed in dry dock or laid on blocks in order that their bottoms may be seen and properly examined. They will also be required to have their timbers completely exposed for examination by a plank or listing, as the Surveyor (who must be an exclusive officer of the Society) may direct, being taken out, either inside or outside, all fore and aft, on both sides, equal to one entire strake, at the first futtock-heads, and another between decks. A few treenails must likewise be driven out, so that the Surveyors, from actual inspection, may be satisfied whether or not they are of the quality and make prescribed by the Rules; and the same, being thus ascertained, shall be reported to the Committee, and a character assigned. (*See also Section 20, page 11.*)

3. If the ship be 400 tons and upwards, the Survey must be made by two Surveyors, and their report signed accordingly.

Section 53. 1. Ships built in the United Kingdom—or in Quebec; or St. John, New Brunswick, or Miramichi, and Northern Ports of New Brunswick, or in Prince Edward Island, or built in Nova Scotia after 1864—and *not surveyed while building* by the Surveyors to this Society, and all ships, the Owners or Builders of which may have refused or declined to permit them to be surveyed at the several periods prescribed by the Rules, will have One Year deducted from the period which would otherwise have been assigned, in consequence of their not having been submitted to Survey during their construction.

2. In no case, however, will a higher grade than 10 A be assigned *for wood materials* to ships built in the United Kingdom which shall not have been surveyed while building.

CONTINUATION OF SHIPS CLASSED A.

Section 54. 1. If on the termination of the period of original designation, or if, at any subsequent period not exceeding two-thirds of the number of years assigned originally, or on Restoration (provided the last paragraph, Section 56, and 2nd and 3rd paragraphs, Section 57, be complied with), the Owner should wish to have his ship remain, or be replaced on the letter A, he is to send a written notice thereof to the Secretary, and the Committee shall then direct a Special Survey, as follows, to be held by not less than two competent persons to be appointed by the Committee, one of them to be a Surveyor, the exclusive officer of the Society.

2. The period assigned for Continuation will commence from the time of the expiration of the term assigned originally or which might have been assigned on the letter A, without regard to the date when the Survey for this purpose may subsequently have been held. This period may be either one-third or two-thirds the number of years assigned originally, or on Restoration, if the last paragraph, Section 56, or the 2nd and 3rd paragraphs of Section 57, be complied with, dependent on which of the following Surveys, designated Survey No. 1, and Survey No. 2, be complied with. (*See also Section 52.*)

3. Ships so Continued shall be distinguished in the Register Book by the number of years for which the character is extended being inserted separately under the number assigned on the original character thereby denoting that the ship has been found on survey in such good and efficient order as to entitle her to be continued for the specified number of years.

4. But if during the last year of the period assigned originally, or on Restoration (when the Restoration is of such a character as to allow of Continuation—see last paragraph of Section 56 and 2nd and 3rd paragraphs of Section 57), the owner of the ship shall, in consequence of her being about to proceed on a distant foreign voyage, apply to have her specially surveyed for Continuation on the letter A, a Special Survey shall be held conformably with this Section.

5. Where such Continuation is assigned, the Half-time Survey as prescribed in Section 34 is to be held, and the vessel to be subject to an annual survey.

6. In cases of the repair of Ships for Continuation of the A Character, materials of a lower grade than those used in the original construction of the ship will be permitted to be used, but they will be noted in the Register Book. Should the materials thus used be not removed on Restoration, the term of Restoration will be reduced, the reduction being regulated by the Mixed Material Rule, Section 34.

7. If, at the termination of the period of Continuation assigned on the original class under Survey No. 2, the owner desires a *further* Continuation of the A Character, the vessel must be submitted to a Special Survey, designated Survey No. 3, when, if found or placed in good and efficient condition, she may be further Continued for a period of one-third the number of years assigned originally; such further Continuation to date from the expiration of the previous Continuation; and if at the end of the term thus assigned the requirements of the Half-time Survey, Section 34, be complied with, and the vessel be favourably reported upon by the Surveyors, she will be allowed to lapse to the character of A in Red (subject to annual Survey) until the expiration of a period of two-thirds the number of years originally assigned, dating from the completion of the Special Survey No. 3.

SURVEY NO. 1.

8. The ship must be either placed in dry dock, or laid on blocks upon ways, so that the keel may be examined.

9. To be scraped or dubbed bright, from the light water-mark upwards, including the plankshears and waterways, so as to expose the surface of the plank to view.*

10. The hold to be cleared, and proper stages to be made both inside and outside.

11. All air-courses and the limbers to be cleared.

12. The condition of the timbers of the frame to be further ascertained, by a *new* listing not less than four inches wide being *cut* out of the ceiling at each end of the hold, on each side, between the keelson and air-course under hold beam clamp, for one-fifth the entire length of the ship.

13. One treenail to be driven out from every alternate frame or fourth timber, between the upper

* If the ship has been sheathed with wood over felt, within a period of five years, and the plank from the light water-mark upwards shall, when so sheathed, have been brightened, and the condition of the bolts, planking, treenails, and caulking ascertained, and favourably reported upon by the Surveyors, the stripping from the light water-mark upwards may, on application to the Committee, be dispensed with, providing that the sheathing which covers the binding-bolts and raft-ports, and a strake of sheathing all fore and aft on each side under the wales be removed, and listings of sheathing be cut out at hood ends; and the planking, fastenings, and caulking so exposed, shall prove to be in good condition; but, whenever the sheathing is removed, the outside planking is to be scraped or dubbed bright, and examined as prescribed by the above Rule.

If the ship has been sheathed with metal within a period of two years, and it shall appear to the Surveyors that stripping from the light water-mark upwards may be dispensed with, the case will receive due consideration on application to the Committee.

edge of the wales and plankshears, and one from every alternate frame or fourth timber, between the upper edge of the wales and the light water-mark, and at such other parts of the bottom as the Surveyors may direct, so as to enable a judgment to be formed as to the general state of the treenails, and the timbers and planking in the treenail holes.

14. Bolts, if of iron, in number not less in any case than six on each side, in the range of each tier of beams to be driven out in ships of 500 tons and under, and increased in number in proportion to the size of the ship.

15. If the fastenings in the range of the lower deck be *of iron not through the outside planking*, one plank on either side is to be removed, so that the condition of the fastenings may be ascertained ; if they are not in a satisfactory condition, the vessel must be through bolted in these parts, as the Surveyors may direct.

16. All treenails, bolts, and listings, removed for the examination of the vessel's condition, to be from such parts as the Surveyors may direct.

17. Where the middle line bolts are of iron, their condition is to be ascertained ; but, if this be not practicable, additional bolts of sufficient size must be driven through the keelson, floors, and keel, in each alternate frame, also through the stem, apron, stern-post, and deadwood.

18. All yellow metal bolts to be tested where practicable, to ascertain if any are broken.

19. The condition of the oakum and caulking to be ascertained.

20. In the case of vessels allowed an additional year in classing for salting, under Section 37, the state of the salting throughout such vessels is to be ascertained and reported upon, and, if necessary, the salt is to be renewed.

21. The windlass to be unhung, and its wood lining sufficiently stripped for examination ; the hatches are to be examined in position at the hatchways, and, if defective, are to be renewed or made good ; the steam steering engine, its connections, the steering rods, chains, blocks, rudder quadrant, tillers, and steering gear to be carefully examined and the condition of the various parts to be stated by the Surveyor on his report of survey ; in sailing vessels the standing rigging should be lifted and the service and parcelling stripped off the nips, bends, and splices for examination, unless the rigging has been recently lifted, when particulars of the case should be submitted for the consideration of the Committee.

22. The cables, masts, spars, and general equipment to be attended to, as prescribed in Sections 72 to 76.

23. The attention of the Surveyors shall then be particularly directed to the state of the upper or main deck and coamings, the upper and lower deck bolts, whether of iron or copper, and the outside planks, through which they pass, the plankshears, waterways, and beams, so far as they can be examined ; the stem, apron, hawse-timbers, knight-heads, breast-hooks, stern-post, inner-post, and transoms ; the floors, keelsons, and keel ; the rudder and windlass ; the planking outside and inside, and the treenails ; the frame and inner surface of the outside planking, where they can be seen ; and the sheer and general form of the ship.

24. The ship to be efficiently repaired with suitable materials.

25. The Surveyors on these points shall transmit to the Committee a detailed report, accompanied by such observations as may occur to them, from inspection of the ship, or from information of the repairs

she may have received. If, from the report of such Special Survey, the ship shall appear to be in a sound and efficient state, the Committee shall continue such ship on the letter A, for such further period as they may think fit, not exceeding, however, *one-third* of the number of years which had been assigned originally, or on Restoration. No ship, however, can have a continuation of the A Character *after Restoration* unless the last paragraph, Section 56, or the 2nd and 3rd paragraphs of Section 57, be complied with.

26. Ships classed A for a less period than six years, will be allowed a Continuation of two years, provided that in addition to the above requirements the Owner shall have removed a plank in each buttock.

27. Ships built in the British North American Colonies will have to comply with the Rules, Section 63.

28. If, however, at the time of the above Survey, or at any time during the term of Continuation, the ship be *diagonally* doubled according to Section 68; then in the case of ships built of wood materials of the 5 years' grade and under, they will be allowed 2 years additional on account of such diagonal doubling; those built of materials exceeding 5 and under 12 years' grade will be allowed 3 years additional, and those built of 12 years' materials and upwards, 4 years additional; provided a strake all fore and aft at the upper edge of the doubling, or the planksheer be removed.

SURVEY NO. 2.

29. For the purpose of holding such Survey, the ship must be placed in dry dock, or laid on blocks upon ways, so that the keel may be examined.

30. All sheathing (wood or metal) to be entirely stripped off the bottom, and elsewhere.*

31. All the outside planking from the light water-mark upwards, including the planksheers and waterways, to be scraped or dubbed bright.

32. The hold to be cleared, and proper stages made both inside and outside.

33. All air-courses and the limbers to be cleared.

34. The condition of the timbers of the frame to be further ascertained by the removal of all the treenails in *one* strake in the topsides fore and aft on each side, and by the removal of *two* planks on each side above the wales (except in vessels of 200 tons or under, when the removal of *one* plank on each side will be deemed sufficient).

35. In addition, a plank to be removed in each bow and each buttock.

36. One treenail to be driven out from every alternate frame or fourth timber between the upper edge of the wales and the light water-mark, and at such other parts of the topsides and bottom as the Surveyors may direct, so as to enable a judgment to be formed as to the general state of the treenails, and the timbers and planking in the treenail holes.

* If the ship has been sheathed with wood over felt, within a period of five years, and the plank shall, when so sheathed, have been brightened, and the condition of the bolts, planking, treenails, and caulking ascertained and favourably reported upon by the Surveyors, the stripping of the wood sheathing may, on application to the Committee, be dispensed with, provided that the sheathing which covers the binding-bolts and raft-ports, and a strake of sheathing all fore and aft on each side under the wales be removed, and listing of sheathing be cut out at hood ends; and the planking, fastenings, and caulking so exposed, shall prove to be in good condition; but, whenever it is removed, the outside planking is to be scraped or dubbed bright, and examined as prescribed by the above Rule.

37. If the *whole* of the treenails from the light water-mark upwards have to be renewed, the removal of a plank in each bow and buttock will be sufficient, provided the timbers in the treenail hole be examined, and found in good condition.

38. Bolts, if of iron, in number not less in any case than six on each side, in the range of each tier of beams, to be driven out in ships of 500 tons and under, and increased in number in proportion to the size of the ship.

39. If the fastenings in the range of the lower deck be *of iron, not through the outside planking*, one plank on either side is to be removed, so that the condition of the fastenings may be ascertained; if they are not in a satisfactory condition, the vessel must be through-bolted in these parts as the Surveyors may direct.

40. *Where the middle line bolts are of iron*, their condition is to be ascertained; but, if this be not practicable, additional bolts of sufficient size must be driven through the keelson, floors, and keel in each alternate frame, also through the stem, apron, sternpost, and deadwood.

41. Plank, or *new* listing of ceiling of sufficient breadth (not less than 4 inches wide), at the discretion of the Surveyors, to be cut out of the ceiling in the range of the floor-heads, or at such height as may, in the judgment of the Surveyors, best expose the timbers of the frame to view, at each end of the hold on each side for one-fifth the entire length of the ship, and for the remaining three-fifths of the ship's length, the state of the timbers to be ascertained by driving out a treenail from every fourth timber in one or other of the strakes of bilge planking. If the Shipowner should prefer it, planking may be removed *outside* at each end of the ship in the range of the floor-heads.

42. In order to ascertain the condition of the upper deck beam ends, a strake of deck next the waterways on each side to be taken up except where it is covered by a poop or a forecastle; and where this exception arises the strake should be removed as far aft as the first beam within the poop, and as far forward as the first beam within the forecastle. On the decks below, as well as on the upper deck beyond the above limits, the plank need not be removed, provided the beams be tested by boring and sounding, and be found good.

43. All treenails, bolts, listings, and planking, removed for the examination of the vessel's condition, to be from such parts as the Surveyors may direct.

44. All yellow metal bolts to be tested where practicable, to ascertain if any are broken.

45. In the case of vessels allowed an additional year in classing for salting under Section 37, the state of the salting throughout is to be ascertained and reported upon, and, if necessary, the salt is to be renewed.

46. The condition of the oakum and caulking to be ascertained.

47. The windlass to be unhung, and its wood lining sufficiently stripped for examination; the hatches are to be examined in position at the hatchways, and, if defective, are to be renewed or made good; the steam steering engine, its connections, the steering rods, chains, blocks, rudder quadrant, tillers, and steering gear to carefully examined and the condition of the various parts to be stated by the Surveyor on his report of survey; in sailing vessels the standing rigging should be lifted and the service and parcelling stripped off the nips, bends, and splices for examination, unless the rigging has been recently lifted, when particulars of the case should be submitted for the consideration of the Committee.

48. The anchors, cables, masts, spars, and general equipment, to be attended to as prescribed in Sections 72 to 76.

49. The attention of the Surveyors shall then be particularly directed to the state of the upper or main deck and coamings, the upper and lower deck bolts, whether of iron or copper, and the outside planks through which they pass; the plankshears, waterways, and beams, so far as they can be examined; the stem, apron, hawse-timbers, knight-heads, breast-hooks, sternpost, inner-post, and transoms; the floors and keelson; the keel, rudder, and windlass; the planking outside and inside, and the treenails; the frame and inner surface of the outside planking, where they can be seen; and the sheer and general form of the ship.

50. The ship to be efficiently repaired with suitable materials.

51. The Surveyors on these points shall transmit to the Committee a detailed report, accompanied by such observations as may occur to them, from inspection of the ship, or from information of the repairs she may have received. If, from the report of such Special Survey, the ship shall appear to be in a sound and thoroughly efficient state, the Committee shall continue such ship on the letter A for such further period as they may think fit, not exceeding, however, *two-thirds* of the number of years which had been assigned originally or on Restoration. No ship, however, can have a Continuation of the A Character *after Restoration*, unless the last paragraph, Section 56, or the 2nd and 3rd paragraphs of Section 57, be complied with.

52. If, however, at the time of the above Survey, or at any time during the term of Continuation, the ship be *diagonally* doubled, and the other requirements be complied with, according to Section 68, then, in case of ships built of wood materials of the 5 years' grade and under, they will be allowed 2 years additional on account of such diagonal doubling; those built of materials exceeding the 5 and under 12 years' grade will be allowed 3 years additional; and those built of 12 years' materials and upwards, 4 years additional.

53. If such extended term be given for the doubling, the materials used in the repairs must be equal in grade to those required in the original construction of the ship, or she will be liable to a reduced class regulated by the Mixed Material Rule, Section 34.

SURVEY NO. 3.

FURTHER CONTINUATION OF SHIPS CLASSED A.

54. For the purpose of holding such Survey, the ship must be placed in dry dock, or laid on blocks upon ways, so that the keel may be examined.

55. All sheathing (wood or metal) to be entirely stripped off the bottom and elsewhere.*

* If the ship has been sheathed in wood over felt, within a period of five years, and the plank shall, when so sheathed, have been brightened, and the condition of the bolts, planking, treenails, and caulking ascertained and favourably reported upon by the Surveyors, the stripping of the wood sheathing may, on application to the Committee, be dispensed with; provided that the sheathing which covers the binding-bolts and raft-ports, and a straise of sheathing all fore and aft on each side under the wales be removed, and listing of sheathing be cut out at hood ends; and the planking, fastenings and caulking so exposed shall prove to be in good condition; but, whenever it is removed, the outside planking is to be scraped and dubbed bright, and examined as prescribed by the above Rule.

56. All the outside planking, from the light water-mark upwards, including the planksheers and waterways, to be scraped or dubbed bright.

57. The hold to be cleared, and proper stages made both inside and outside.

58. All air-courses and the limbers to be cleared.

59. The condition of the timbers of the frame to be further ascertained by the removal of planking equal to one strake fore and aft on each side above the wales; and a short plank in each buttock. In addition, a strake of planking to be removed, or a new listing of sufficient breadth not less than four inches, all fore and aft on each side in the ceiling above the floor heads; or, if the Shipowner should prefer it, a strake of planking may be removed outside at the same height.

60. One treenail to be driven out from every alternate frame or fourth timber between the upper edge of the wales and the light water-mark, and at such other parts of the topsides and bottom as the Surveyors may direct, so as to enable a judgment to be formed as to the general state of the treenails and the timbers and planking in the treenail holes.

61. Bolts, if of iron, in number not less in any case than six on each side, in the range of each tier of beams to be driven out in ships of 500 tons and under, and increased in number in proportion to the size of the ship.

62. If the fastenings in the range of the lower deck be *of iron, not through the outside planking*, one plank on either side is to be removed, so that the condition of the fastenings may be ascertained; if they are not in a satisfactory condition, the vessel must be through-bolted in these parts, as the Surveyors may direct.

63. *Where the middle line bolts are of iron*, their condition is to be ascertained; but, if this be not practicable, additional bolts of sufficient size must be driven through the keelson, floors, and keel in each alternate frame, also through the stem, apron, stern-post, and deadwood.

64. In order to ascertain the condition of the upper deck beam ends, a strake of deck next the waterways on each side to be taken out, except where it is covered by a poop or a forecastle; and, where this exception arises, the strake should be removed as far aft as the first beam within the poop, and as far forward as the first beam within the forecastle. On the decks below, as well as on the upper deck beyond the above limits, the plank need not be removed, provided the beams be tested by boring and sounding, and be found good.

65. All treenails, bolts, listings, and planking, removed for the examination of the vessel's condition, to be from such parts as the Surveyors may direct.

66. All yellow metal bolts to be tested when practicable, to ascertain if any are broken.

67. In the case of vessels allowed an additional year in classing for salting under Section 37, the state of the salting throughout is to be ascertained and reported upon, and, if necessary, the salt is to be renewed.

68. The condition of the oakum and caulking to be ascertained.

69. The windlass to be unhung, and its wood lining sufficiently stripped for examination; the hatches are to be examined in position at the hatchways, and, if defective, are to be renewed or made good; the steam steering engine, its connections, the steering rods, chains, blocks, rudder quadrant, tillers, and steering gear to be carefully examined and the condition of the various parts to be stated by the Surveyor,

on his report of survey; in sailing vessels the standing rigging should be lifted and the service and parcelling stripped off the nips, bends, and splices for examination, unless the rigging has been recently lifted, when particulars of the case should be submitted for the consideration of the Committee.

70. The anchors, cables, masts, spars, and general equipment, to be attended to as prescribed in Sections 72 to 76.

71. The attention of the Surveyors shall then be particularly directed to the state of the upper or main deck and coamings, the upper and lower deck bolts, whether of iron or copper, and the outside planks through which they pass, the planksheers, waterways and beams, so far as they can be examined; the stem, apron, hawse-timbers, knight-heads, breast-hooks, stern-post, inner-post, and transoms, the floors and keelson, the keel, rudder, and windlass; the planking outside and inside, and the treenails; the frame and inner surface of the outside planking, where they can be seen; and the sheer and general form of the ship.

72. The ship to be efficiently repaired with suitable materials.

73. The Surveyors on these points shall transmit to the Committee a detailed report, accompanied by such observations as may occur to them, from inspection of the ship, or from information of the repairs she may have received. If, from the report of such Special Survey, the ship shall appear to be in a sound and thoroughly efficient state, the Committee shall continue such ship on the letter A for such further period as she may be eligible, not exceeding, however, *one-third* of the number of years which had been assigned originally, such further Continuation to date from the expiration of the term of Continuation assigned under the Second Survey.

74. If, however, at the time of the above Survey, or at any time during the term of Continuation the ship be *diagonally* doubled, and the other requirements be complied with, according to Section 68, then, in case of ships built of wood materials of the 5 years' grade and under, they will be allowed 2 years additional on account of such diagonal doubling; those built of materials exceeding the 5 and under 12 years' grade will be allowed 3 years additional; and those built of 12 years' materials and upwards, 4 years additional.

75. If such extended term be given for the doubling, the materials used in the repairs must be equal in grade to those required in the original construction of the ship, or she will be liable to a reduced class regulated by the Mixed Material Rule, Section 34.

RESTORATION OF SHIPS TO THE CHARACTER A.

Section 55. 1. If at *any age* of a vessel the Owner be desirous to have his ship Restored to the A character, such Restoration will be granted for a period not exceeding *one-half* of the term originally assigned, the same to be calculated from the date of such repairs; provided that a Special Survey as hereafter described be held by two Surveyors, one of them to be an exclusive Officer of the Society, and that all repairs found necessary be completed to their satisfaction.

2. If, at the expiration of such Restoration, the owner be desirous to have his ship again Restored, she must be subjected to the requirements of the second Rule for Restoration.

REQUISITES FOR RESTORATION.—FIRST RULE.*

Section 56. 1. The ship must be placed in dry dock, or laid on blocks upon ways, so that the keel may be examined.

2. All sheathing (wood and metal) to be entirely stripped off the bottom and elsewhere.

3. All the outside planking from the light water-mark upwards, including the waterways, poop and forecastle, plankshears, the stem, knight-heads and hawse-timbers, and the stern-post and rudder, where exposed; also the shelves, clamps, hold-beams, waterways, all inside planking, and the keelson to be scraped or dubbed bright.

4. The hold to be cleared, and proper stages made both inside and outside.

5. All air-courses and the limbers to be cleared. The condition of the timbers of the frame to be further ascertained by the removal of one strake of topside planking all fore and aft on each side.

6. In addition, a plank to be removed in each bow and each buttock.

7. In all cases the outside planks through which the chain and preventer bolts pass must be removed.

8. In flush-deck ships all the planksheer and spirketting to be removed, but in ships having a poop or top-gallant forecastle it will only be necessary to remove the planksheer and spirketting between these and the mouldings in continuation of the planksheer forward and aft, or a portion of topside planking extending from the fore part of the poop aft, and from the after part of the top-gallant forecastle forward.

9. One treenail to be driven out from every alternate frame or fourth timber between the upper edge of the wales and the planksheer, and one from every alternate frame or fourth timber between the upper edge of the wales and the light water-mark, also one to be driven out from every fourth timber for half the vessel's length amidships on each side at the bilge, and at such other parts of the vessel as the Surveyors may direct, in order that the state of the treenails, and the timbers and planking in the treenail holes, may be ascertained.

10. Bolts, if of iron, in number not less in any case than six on each side, in the range of each tier of beams, to be driven out in ships of 500 tons and under, and increased in number in proportion to the size of the ship.

11. If the fastenings in the range of the lower deck be of *iron*, *not through the outside planking*, one plank on each side is to be removed, so that the condition of these fastenings may be ascertained; if they are not in a satisfactory condition, the vessel must be through-bolted in these parts as the Surveyors may direct.

12. *Where the middle-line bolts are of iron*, their condition is to be ascertained; but, if this be not practicable, additional bolts of sufficient size must be driven through the keelson, floors, and keel, in each alternate frame also through the stem, apron, sternpost, and deadwood.

13. A strake of ceiling to be removed all fore and aft, in the range of the first futtock-heads, or at such height forward and aft as may, in the judgment of the Surveyors, best expose the timbers of the frame and chocks to view.

14. One plank of ceiling on each side at the floor-heads to be removed.

* In the case of the Restoration of ships previously doubled, or ships of peculiar construction, special application may be made to the Committee.

15. In order to ascertain the condition of the deck beam ends, a stave of deck next the main or inner waterway to be removed from each tier of beams, excepting that, in ships having a poop or a top-gallant forecastle, the upper deck need not be removed abaft the first beam within the poop, or before the first beam within the forecastle; provided the remainder of the upper deck beams under the poop and forecastle be tested by boring and sounding, and be found good.

16. All treenails, bolts, listings, and planking, removed for the examination of the vessel's condition, to be from such parts as the Surveyors may direct.

17. All yellow metal bolts to be tested, where practicable, to ascertain if any are broken.

18. In the case of vessels allowed an additional year in classing for salting under Section 37, the state of the salting throughout is to be ascertained and reported upon, and, if necessary, the salt is to be renewed.

19. The condition of the oakum and caulking to be ascertained.

20. The windlass to be unhung, and its wood lining sufficiently stripped for examination; the hatches are to be examined in position at the hatchways, and, if defective, are to be renewed or made good; the steam steering engine, its connections, the steering rods, chains, blocks, rudder quadrant, tillers, and steering gear to be carefully examined and the condition of the various parts to be stated by the Surveyor on his report of survey; in sailing vessels the standing rigging should be lifted and the service and parcelling stripped off the nips, bends, and splices for examination, unless the rigging has been recently lifted, when particulars of the case should be submitted for the consideration of the Committee.

21. The anchors, cables, masts, spars, and general equipment to be attended to as prescribed in Sections 72 to 76.

22. When in the state above described, the ship is to be submitted to a special survey and examination, at which the attention of the Surveyors is to be particularly directed to the state of the upper or main deck and coamings, the upper and lower deck bolts, whether of iron or copper, and the planks through which they pass; the waterways and beams so far as they can be examined; the stem, apron, hawse-timbers, knight-heads, breast-hooks, stern-post and transoms; the floors, keelson, and keel; the rudder and all its parts and hangings; the planking outside and inside, and the treenails; the frame and inner surface of the outside planking, where they can be seen; and the sheer and general form of the ship.

23. If, after the above examination, the Owner should consent to take out all planks, timbers, beams, knees, waterways, fastenings, and other parts that may be found defective, or objected to, and replace them with materials of the same species, or of equal quality to that required in vessels of two-thirds the number of years (by their timber material) of the ship's original construction, then such ships to be entitled to be Restored for a period not exceeding *one-half* the number of years originally assigned.

24. If, however, in addition to the above, or at any time during the term of Restoration, the ship be *diagonally* doubled, according to Section 68, then in the case of ships built of the 5 years' grade and under, 2 years additional will be allowed; if built of materials exceeding the 5 and under the 12 years' grade, 3 years additional; and if of 12 years' material, 4 years additional will be allowed.*

25. Ships Restored, to be subject to annual survey, and also to a half-time survey, as prescribed in Section 34.

* As regards ships which have already had a prolonged term for doubling, see Section 68.

26. Ships of 300 tons or above, Restored according to the foregoing Rule, will not be allowed a Continuation of the Character A at the expiration of the Restoration, unless they be diagonally doubled as prescribed in Section 68. But if they be under 300 tons, and exceeding 20 years of age, to be allowed a Continuation, the bottom planking must either be doubled, as prescribed in Section 68, or else renewed for half the length amidships from the second futtock-heads to the keel, in addition to the other requirements of Section 54.

SECOND RULE.

Section 57. 1. If, at any age of a vessel, the owner be desirous to have his ship Restored to the A character for a longer period than one-half her original classification, she must be subjected to the Special Survey hereafter described, to be held by two Surveyors, one of them to be an exclusive Officer of the Society, and all repairs found necessary must be completed to their satisfaction.

2. If the vessel be 300 tons or above, she must be diagonally doubled, as per Section 68, unless the whole of the planking from the keel to the height of the second futtock-heads be renewed,* when the doubling may be dispensed with.

3. But if she be under 300 tons, and exceeding twenty years of age, she must have the bottom planking renewed* for one half the length amidships from the second futtock-heads to the keel, or be diagonally doubled, as per Section 68.

4. Vessels which have undergone this rule will be entitled to be Restored for a period not exceeding two-thirds the number of years originally assigned (exclusive of any period which might have been previously assigned for doubling), and in addition, if the vessel be at this time diagonally doubled, in accordance with the Rules, Section 68, the term prescribed for such doubling will be allowed.†

5. When extensive repairs are effected under this rule, and a large proportion of low class materials has been removed and replaced by wood of a higher grade, then, if additional fastenings have been introduced, and the workmanship is of a superior description, the vessel will receive the same consideration with a view to assigning her an improved Class under the Mixed Material Rule, Section 34, as in ships on their original construction.

REQUISITES FOR RESTORATION.—SECOND RULE.‡

Section 58. 1. The ship must be placed in dry dock or laid on blocks upon ways, so that the keel may be examined.

2. All sheathing (wood and metal) to be entirely stripped off the bottom and elsewhere.

3. The hold to be cleared, and proper stages made both inside and outside.

4. All the outside planking from the lower part of the chocks at floor-heads upwards, the stem, knight-heads, hawse-timbers, stern-post, and rudder where exposed ; also the shelves, clamps, bilge planks, ceiling, and keelsons, to be scraped or dubbed bright.

* If the whole of the ceiling from the bilges downwards has been removed, and the edges of the outside planking and its general condition be found satisfactory, or if the outside planking shall have been recently renewed, the Committee will be prepared to give consideration to any application that may be made to them for a relaxation of the requirements above stated.

† In the case of Restoration of ships previously doubled, or ships of peculiar construction, special application may be made to the Committee.

‡ If the vessel be *Salted* in accordance with Section 37 during repairs under the Second Rule for Restoration, she will be allowed the advantage of the Rule for Salting.

5. All air-courses and the limbers to be cleared.
6. The upper deck waterways, spirketting, planksheers, sheerstrakes, and topside planks, through which the upper deck shelf-lodging-knee and waterway bolts pass, to be removed.
7. Two planks in each bow and each buttock to be removed.
8. In all cases, the outside planks through which the chain and preventer bolts pass must be removed.
9. If the bolts in the range of the lower deck be *iron*, the outside planks through which they pass must be removed.
10. One treenail to be driven out from every alternate frame or fourth timber between the upper edge of the wales and the planksheer, and one from every alternate frame or fourth timber between the upper edge of the wales and the light water-mark, also one to be driven out from every fourth timber, for half the vessel's length amidships on each side at the bilge, and at such other parts of the vessel as the Surveyors may direct, in order that the state of the treenails and the timbers and planking in the treenail holes may be ascertained.
11. If the fastenings in the range of the lower deck be of *iron*, *not through the outside planking*, one plank on each side is to be removed, so that the condition of these fastenings may be ascertained ; if they are not in a satisfactory condition, the vessel must be through-bolted in these parts as the Surveyors may direct.
12. *Where the middle line bolts are of iron*, their condition is to be ascertained ; but, if this be not practicable, additional bolts of sufficient size must be driven through the keelson, floors, and keels in each alternate frame, also through the stem, apron, stern-post, and deadwood.
13. Two strakes of ceiling in the range of the first futtock-heads, and one strake in the range of the floorheads, to be removed on each side all fore and aft.
14. The strake of upper deck plank next the hatchways to be removed all fore and aft.
15. A strake of deck next the waterway or spirketting, on the hold or lower deck beams, to be removed.
16. All treenails, bolts, listings, and planking, removed for the examination of the vessel's condition to be from such parts as the Surveyors may direct.
17. All yellow metal bolts to be tested where practicable, to ascertain if any are broken.
18. In the case of vessels allowed an additional year in classing for salting under Section 37, the state of the salting throughout is to be ascertained and reported upon, and, if necessary the salt is to be renewed.
19. The condition of the oakum and caulking to be ascertained.
20. The windlass to be unhung, and its wood lining sufficiently stripped for examination ; the hatches are to be examined in position at the hatchways, and, if defective, are to be renewed or made good ; the steam steering engine, its connections, the steering rods, chains, blocks, rudder quadrant, tillers, and steering gear to be carefully examined and the condition of the various parts to be stated by the Surveyor on his report of survey ; in sailing vessels the standing rigging should be lifted and the service and parcelling stripped off the nips, bends, and splices for examination, unless the rigging has been recently lifted, when particulars of the case should be submitted for the consideration of the Committee.
21. The anchors, cables, masts, spars, and general equipment to be attended to as prescribed in Sections 72 to 76.

22. When in the state above described, the ship to be submitted to a special survey and examination at which the attention of the Surveyors is to be particularly directed to the state of the upper deck and coamings, the upper and lower deck binding bolts, whether of iron or copper, and the planks through which they pass ; the beams, stem, apron, hawse-timbers, knight-heads, breast-hooks, stern-post, inner-post, and transoms ; the floors, keelson and keel ; the rudder and all its parts and hangings ; the planking outside and inside and the treenails ; the frame and inner surface of the outside planking, where they can be seen ; and the sheer and general form of the ship.

23. If, after the above examination, the Owner should consent to take out all planks, timbers, beams, knees, fastenings, and other parts that may be found defective, or objected to, and replace them with materials of the same species or of equal quality *to that required in vessels of two-thirds the number of years (by their timber material) of the ship's original construction*, and she be *diagonally doubled* as per Section 68, or *planking renewed as required by Section 57*, then she will be entitled to be restored for a period not exceeding two-thirds the number of years assigned originally, and the term allowed for doubling, viz., 2 years additional if built of wood materials of the five years' grade and under ; 3 years additional, if built of materials exceeding the 5 years' and under 12 years' grade ; and 4 years additional, if built of 12 years' material or above.

24. Ships thus Restored to be subject to annual survey, and to the half-time survey, as prescribed in Section 34.

CONTINUATION ON RESTORATION.

Section 59. 1. Ships which have been doubled when *Restored* (or in which the requirements of the last paragraph, Section 56, or the second and third paragraphs of Section 57, have been complied with) shall be entitled to Continuation, subject to the same conditions of survey and examination as are prescribed for ships proposed to be Continued at the expiration of the period first assigned to them (Section 54) ; but, in like manner, the term of such extended Continuation shall be limited to a period not exceeding one-third or two-thirds of the number of years for which the ships may respectively have been *Restored* (exclusive of time allowed for doubling), without any reference whatever to the period originally assigned to them.

EXPIRATION OF CHARACTER.

2. At the termination of the several periods assigned to ships remaining on the Character A, or A in Red, they will have the word "*Expired*" inserted against them ; and if not surveyed prior to the reprinting of the Register Book, they will appear without any character.*

3. But if, during the *last year* of the period assigned to them, the Owners of a ship shall, in consequence of her being about to proceed on a distant foreign voyage, apply to have her surveyed for Continuation of the letter A, or for the Character A in Red, a special survey shall be held conformably to

* The terms of years assigned to ships on the Character A, launched *previously to the 1st July, 1859*, also of ships launched during the *first six months of the years 1860, 1861, 1862, and 1863*, will expire on the 31st December of the last year of the periods assigned to them respectively.

The terms assigned to ships launched during the *last six months of the years 1859, 1860, 1861, and 1862*, will expire on the 30th June next after the last year of the periods assigned to them respectively.

In the case of ships launched on and after the 1st July, 1863, the period originally assigned to them on the A character, will in every case *date from the month* in which the vessel may be launched, and will expire at the end of the corresponding month in the year at which the period assigned terminates.

the Rules, Section 54 or 60, as the case may be; and if from the report of such Special Survey, the ship shall appear to be in all respects in a sound and efficient state, such as is required by those Rules, the Committee shall, from the period at which the ship's Character would terminate, continue on the letter A, or will assign to her the Character A in Red in accordance with the Rules referred to.

SHIPS CLASSED A, IN RED.

Section 60. 1. Ships found on survey to be of a superior description, being fit for the safe conveyance of dry and perishable goods, subject to the following conditions, shall be classed A in Red, as the Second description of the First class.

2. In all cases in which the Owner may claim this character, the ship must undergo a special survey by two Surveyors (to be appointed in every instance by the Committee), one of whom shall be an exclusive Officer of the Society. (*See also Section 52 for Ships not built under Survey.*)

3. Then if the following Survey, designated Survey No. 1, be complied with within twelve months of the expiration of the Character A, either on original Classification, Continuation, or Restoration, one-third of the number of years assigned originally, or such as might have been assigned, will be granted from the date of such Survey; *but, if this Survey be not complied with within the above stated time, the period named will commence from the expiration of the original Classification, Continuation, or Restoration.*

4. *If after the expiration of the period assigned, or which might have been assigned, under the FIRST Survey, the character A in red be sought, the following Survey, designated No. 2, must be complied with, when a period of two-thirds the number of years assigned originally, or such as might have been assigned will be granted from the date of such Survey.*

5. *The character A in red for a period of two-thirds the number of years originally assigned may, however, be obtained at ANY time, provided the requirements of Survey No. 2 be complied with.*

6. In the repair of vessels for the above character, no materials may be used of a description inferior to those allowed in new ships for the six years' grade, except in the case of vessels originally classed for a shorter period than six years, when materials equal to those used in the original construction will be permitted.

FIRST SURVEY FOR A, IN RED.

7. The ship must either be placed in dry dock, or laid on blocks upon ways, so that the keel may be examined.

8. To be scraped or dubbed bright from the light water-mark upwards, including the plankshears and waterways, so as to expose the surface of the plank to view.*

9. The hold to be cleared, and proper stages to be made both inside and outside.

10. All air-courses and the limbers to be cleared.

* If the ship has been sheathed with wood over felt within a period of five years, and the plank from the light water-mark upwards shall, when so sheathed, have been brightened, and the condition of the bolts, planking, treenails, and caulking ascertained, and favourably reported upon by the Surveyors, the stripping from the light water-mark upwards may, on application to the Committee, be dispensed with, provided the sheathing which covers the raft-ports and binding-bolts, and a stave of sheathing all fore and aft on each side under the wales be removed, and listings of sheathing be cut out at hood ends, and the planking, fastenings, and caulking so exposed shall prove to be in good condition; but, whenever the sheathing is removed, the outside planking is to be scraped or dubbed bright and examined as prescribed by the above Rules.

If the ship has been sheathed with metal within a period of two years, and it shall appear to the Surveyors that stripping from the light water-mark upwards may be dispensed with, the case will receive due consideration on application to the Committee.

11. The condition of the timbers of the frame to be further ascertained by a *new* listing not less than 4 inches wide, being *cut* out of the ceiling at each end of the hold on each side, between the keelson and air-course under the hold-beam clamp, for one-fifth the entire length of the ship.

12. One treenail to be driven out from every alternate frame or fourth timber between the upper edge of the wales and the planksheers, and one from every alternate frame or fourth timber between the upper edge of the wales and the light water-mark, and at such other parts of the bottom as the Surveyors may direct, so as to enable a judgment to be formed as to the general state of the treenails, and the timbers, and planking in the treenail holes.

13. Bolts, if of iron, in number not less in any case than six on each side, in the range of each tier of beams to be driven out in ships of 500 tons and under, and increased in number in proportion to the size of the ship.

14. If the fastenings in the range of the lower deck be *of iron, not through the outside planking*, one plank on either side is to be removed, so that the condition of the fastenings may be ascertained; if they are not in a satisfactory condition, the vessel must be through-bolted in these parts, as the Surveyors may direct.

15. All treenails, bolts, and listings, removed for the examination of the vessel's condition, to be from such parts as the Surveyors may direct.

16. *Where the middle line bolts are of iron*, their condition is to be ascertained; but, if this be not practicable, additional bolts of sufficient size must be driven through the keelson, floors, and keel in each alternate frame, also through the stem, apron, stern-post, and deadwood.

17. All yellow metal bolts to be tested where practicable, to ascertain if any are broken.

18. In the case of vessels allowed an additional year in classing for salting under Section 37, the state of the salting throughout is to be ascertained and reported upon, and, if necessary the salt is to be renewed.

19. The condition of the oakum and caulking to be ascertained.

20. The windlass to be unhung, and its wood lining sufficiently stripped for examination.

21. The anchors, cables, masts, spars, and general equipment to be attended to as prescribed in Sections 72 to 76.

22. The attention of the Surveyors shall then be particularly directed to the state of the upper or main deck and coamings; the upper and lower deck bolts, whether of iron or copper, and the planks through which they pass; the planksheers, waterways, and beams, so far as they can be examined; the stem, apron, hawse-timbers, knight-heads, breast-hooks, stern-post, inner-post, and transoms; the floors, keelsons, and keel; the rudder and windlass; the planking outside and inside, and the treenails; the frame and inner surface of the outside planking, where they can be seen; and the sheer and general form of the ship.

23. The ship to be efficiently repaired with suitable materials.

24. The term for which a vessel may be assigned the Character A in Red, upon a compliance with the foregoing requirements, will not exceed one-third the number of years of that assigned originally, or such as might have been assigned, subject to the usual annual survey, and also to the half-time survey, as prescribed in Section 34.

25. If, however, in addition to the above, the ship be *diagonally* doubled according to Section 68, then, in the case of ships built of wood materials of the 5 years' grade and under, they will be allowed 2 years additional on account of such diagonal doubling; those built of materials exceeding the 5 and under

the 12 years' grade, will be allowed 3 years additional; and those built of 12 years' materials and upwards 4 years additional,* provided a strake all fore and aft at the upper edge of the doubling, or the planksheers be removed.

SECOND SURVEY FOR A, IN RED.

26. For the purpose of holding such Survey, the ship must be placed in dry dock, or laid on blocks upon ways, so that the keel may be examined. (*See also* Section 52 for ships not built under Survey.)

27. All sheathing (wood and metal) to be entirely stripped off the bottom and elsewhere.†

28. All the outside planking, from the light water-mark upwards, including the planksheers and waterways, to be scraped or dubbed bright.

29. The hold to be cleared, and proper stages made both inside and outside.

30. All air-courses and the limbers to be cleared.

31. The condition of the timbers of the frame to be further ascertained by the removal of all the treenails in one strake in the topsides fore and aft, on each side, and by the removal of two planks on each side above the wales, except in vessels of 200 tons, or under, when the removal of *one* plank on each side will be deemed sufficient.

32. In addition, a plank to be removed in each bow and each buttock.

33. One treenail to be driven out from every alternate frame or fourth timber, between the upper edge of the wales and the light water-mark, and at such other parts of the topsides and bottom as the Surveyors may direct, so as to enable a judgment to be formed as to the general state of the treenails, and the timbers and planking in the treenail holes.

34. If the whole of the treenails from the light-water mark upwards have to be renewed, the removal of a plank in each bow and buttock will be sufficient, provided the timbers in the treenail holes be examined and found in good condition.

35. Bolts, if of iron, in number not less in any case than six on each side, in the range of each tier of beams to be driven out in ships of 500 tons and under, and increased in number in proportion to the size of the ship.

36. If the fastenings in the range of the lower deck be *of iron, not through the outside planking*, one plank on either side is to be removed, so that the condition of the fastenings may be ascertained; if they are not in a satisfactory condition, the vessel must be through-bolted in these parts, as the Surveyors may direct.

37. *Where the middle-line bolts are of iron*, their condition is to be ascertained; but, if this be not practicable, additional bolts of sufficient size must be driven through the keelson, floors, and keel in each alternate frame, also through the stem, apron, stern-post, and deadwood.

38. Plank, or a new listing of ceiling, of sufficient breadth (not less than four inches wide), at the discretion of the Surveyors, to be cut out of the ceiling in the range of the floor-heads, or at such height as may in the judgment of the Surveyors best expose the timbers of the frame to view, at each end of the hold for one-fifth

* *In the case of ships previously doubled, or ships of peculiar construction, special application may be made to the Committee.*

† If the ship has been sheathed with wood over felt, within a period of five years, and the plank shall, when so sheathed, have been brightened, and the condition of the bolts, planking, treenails, and caulking ascertained and favourably reported upon by the Surveyors, the stripping of the wood sheathing may, on application to the Committee, be dispensed with; provided that the sheathing, which covers the binding-bolts, and raft-ports, and a strake of sheathing all fore and aft on each side under the wales be removed, and listing of sheathing be cut out at hood ends; and the planking, fastenings, and caulking so exposed shall prove to be in good condition; but, whenever it is removed the outside planking is to be scraped or dubbed bright, and examined as prescribed by the above Rule.

the entire length of the ship, and for the remaining three-fifths of the ship's length the state of the timbers to be ascertained by driving out a treenail from every fourth timber in one or other of the strakes of the bilge planking. If the Shipowner should prefer it, planking may be removed *outside*, at each end of the ship, in the range of the floor-heads.

39. In order to ascertain the condition of the upper deck beam ends, a strake of deck next the waterways on each side to be taken out, except where it is covered by a poop, or a forecastle, and where this exception arises the strake should be removed as far aft as the first beam within the poop, and as far forward as the first beam within the forecastle. On the decks below, as well as on the upper deck beyond the above limits, the plank need not be removed, provided the beams be tested by boring and sounding and be found good.

40. All treenails, bolts, listings, and planking removed for the examination of the vessel's condition, to be from such parts as the Surveyors may direct.

41. All yellow metal bolts to be tested where practicable, to ascertain if any are broken.

42. In the case of vessels allowed an additional year in classing for salting under Section 37, the state of the salting throughout is to be ascertained and reported upon, and, if necessary, the salt is to be renewed.

43. The condition of the oakum and caulking to be ascertained.

44. The windlass to be unhung, and its wood lining sufficiently stripped for examination.

45. The anchors, cables, masts, spars and general equipment to be attended to as prescribed in Sections 72 to 76.

46. The attention of the Surveyors shall then be particularly directed to the state of the upper or main deck and coamings; the upper and lower deck bolts, whether of iron or copper, and the planks through which they pass; the plankshears, waterways, and beams, so far as they can be examined; the stem, apron, hawse-timbers, knight-heads, breast-hooks, stern-posts, inner-post, and transoms; the floors, keelsons, and keel; the rudder and windlass, the planking outside and inside, and treenails, the frame and inner surface of the outside planking, where they can be seen, and the sheer and general form of the ship.

47. The ship to be efficiently repaired with suitable materials.

48. To entitle them to continue this Character, such ships will be required, in addition to the usual annual survey, to undergo the half-time survey as prescribed in Section 34, and to undergo a special re-survey as prescribed above, within a period (from the date of the last special re-survey) not exceeding *two-thirds* of the several terms of years originally assigned to them, or earlier, if, in the judgment of the Surveyors, upon a careful examination of the ship, the same shall appear to them to be necessary.

49. If, however, in addition to the above, the ship be *diagonally* doubled, and the other requirements be complied with, according to Section 68, then, in case of ships built of wood materials of the 5 years' grade and under, they will be allowed 2 years additional on account of such diagonal doubling; those built of materials exceeding the 5 and under the 12 years' grade, will be allowed 3 years additional; and those built of 12 years' materials and upwards, 4 years additional. *

* In the case of ships previously doubled, or ships of peculiar construction, special application may be made to the Committee.

SHIPS CLASSED \ae .

Section 61. 1. Ships that have passed the prescribed age for the A Character, but have not undergone the repairs which would have entitled them to be Continued or Restored; or having been Continued or Restored, or classed A in Red, and the additional period thus assigned expired, and also such ships as have never had an original character, which shall be found on survey fit for the conveyance of dry and perishable goods on *shorter voyages*, shall be distinguished by the diphthong \ae , upon compliance with the undermentioned Survey. (See also Section 52 for Ships not built under Survey.)

SURVEY.

2. The ship to be placed on blocks, so that the keel and bottom may be seen and properly examined and the caulking tested.
3. The hold to be cleared and proper stages made both inside and outside.
4. The limbers and all air-courses to be cleared.
5. A listing to be cut out of the ceiling, not less than four inches wide, in the range of the floor-heads or at such height as may, in the judgment of the Surveyors, best expose the timbers of the frame to view, at each end of the hold on each side for one-fifth the extreme length of the vessel.
6. The outside planking to be scraped bright where the Surveyors may consider it to be necessary from any apparent defect.
7. Bolts of lower deck (if of iron) in number not less than six on each side, and treenails in number not less than twelve on each side, to be driven out at various parts of the ship.
8. The attention of the Surveyors is to be then particularly directed to the state of the upper or main deck and coamings, the upper and lower deck bolts, *whether of iron or copper*, and the outside planks through which they pass, and to all other parts of the ships, so far as they can be examined.
9. The windlass to be unhung and its wood lining sufficiently stripped for examination; and the chain cables to be removed from the lockers and ranged, and, with the anchors, masts, spars, and general equipment, examined so as to be satisfactorily reported upon.
10. Where the middle-line bolts are of iron, their condition is to be ascertained; but, if this be not practicable, additional bolts of sufficient size must be driven through the keelson, floors, and keel in each alternate frame, also through the stem, sternpost, and deadwood.
11. If the \ae Character be then assigned, it shall be continued, subject to an annual survey for a period not exceeding four years, at the expiration of which time the Character will be discontinued unless the vessel be again submitted to a similar Special Survey.*

BRITISH NORTH AMERICA AND ALL FIR SHIPS.†

Section 62. 1. Ships built in the British North American Colonies, and all ships wherever built the frames of which are composed of *Fir*, of 400 tons and above, shall, in order to entitle them to be classed in the Register Book of the Society, be secured in their bilges by the application of iron knee riders, or hanging-knees and riders to cover the joints of the floor and futtock-heads, to extend from the height of the hold beams to the floors so as to receive not less than two bolts in a substantial part of the floors.

* For doubling of ships of the above Class, see Section 68.

† See also Section 39, paragraph 5.

2. The number of iron knees and riders to be not less than one of each to every hold or lower deck beam on each side. The knees to be connected with riders or not, at the option or convenience of the Owners, but if not so connected, the side arms of the knees are to be of the length and to be fastened as prescribed in Table F. "*Jumped knees*" will not be allowed.

3. The number of knees to each deck, and of riders, also their dimensions, and number of bolts, are fully explained in Table F.

4. All ships built in the Colonies will be considered as "iron fastened" in their centre lines, unless it shall be satisfactorily shown to the contrary, either by the exposure of some of the bolts or by a certificate to be produced from the Builders.

5. Ships which proceed to sea *without being fastened with the iron knees and riders prescribed by the Rules,* will have One Year deducted* from the period to which they would otherwise be entitled to be classed in the Register Book.

BRITISH NORTH AMERICAN BUILT SHIPS.

Section 63. 1. All British North American built ships, which have gone, or may go off the List of Ships of the A character, or which may be of an age exceeding the period for which they might have had claims to be put upon that grade (whether classed or not), shall, as from time to time they come under examination, be subjected to a careful Survey, to be made by one of the Surveyors to this Society;—and no further Character shall be assigned them unless a Survey shall be held as follows; either by removing planking *outside*, equal in breadth to an entire strake for one-fifth the length of the vessel forward and aft on both sides, or by cutting listings *inside* five inches wide to the same extent in the fore and aft bodies in line with the upper turn of bilges, or at such height as may, in the judgment of the Surveyors, best expose the timbers of the frame to view, and for the remaining three-fifths of the vessel amidships the state of the timbers to be ascertained by driving out a treenail in every fourth timber in one or other strake of bilge planking. A special report of the state of these timbers, and of the general state and condition of the upper deck fastenings, waterways, spirketting, plankshears, topsides, upper deck with its appendages, lower deck fastenings, wales, counter, plank and treenails outside to the water's edge, rudder, windlass and capstan, beams and breast-hooks, shall then be transmitted by the Surveyor to the Committee; and on the receipt of such report the character shall be assigned.

2. *If, in addition to the requirements contained in Section 61, the above Survey be complied with and the E Character be assigned, it shall be Continued, subject to an annual Survey, for a period not exceeding four years, at the expiration of which time the Character will be discontinued unless the vessel be again submitted to a similar Special Survey.*

SHIPS CLASSED E.

Section 64. Will comprise all ships which shall be found on Survey fit for the conveyance of cargoes not in their nature subject to sea-damage.

Section 65. 1. To entitle vessels to this Character they must be subjected to the following Survey.

2. To be placed on blocks so that the keel and bottom may be examined, and the caulking tested. Treenails, not less than twelve on each side, to be driven out at various parts of the ship, for the purpose of ascertaining their condition and that of the timbers and planking through which they pass.

* This applies not only to British North American ships, but to all wooden vessels.

3. The windlass to be examined, and the chain cables to be ranged, and the equipment generally examined and reported upon.

4. If the E Character be then assigned, it shall be Continued, subject to an annual survey, for a period not exceeding three years, at the expiration of which time the Character will be discontinued unless the vessel be again submitted to a similar Special Survey.*

Section 66. The Classification of Ships with the Character I, is discontinued.

CAULKING.

Section 67. 1. The bottom of every ship is to be CAULKED† once in every five years, unless wood-sheathed and felted, and then once in every seven years, except in the case of *Teak-built ships*, upon which a Special Survey may have been requested, and the Surveyors having ascertained, by the removal of a strake of sheathing fore and aft under the wales, and a strake at the first futtock-heads, and by causing listings to be cut out at the hood ends, that such caulking is not required, the same may then be dispensed with.

2. If any ship shall be stripped within the periods above mentioned, her bottom is to be caulked, if necessary. (See Section 70.)

DOUBLING.

Section 68. 1. In all cases in which ships may be doubled, doubling of not less than the thickness hereinafter mentioned will be required, the same to be properly wrought and fastened as follows: in every instance the doubling is to be at least single fastened either with treenails or with bolts,‡ and a through-bolt in every butt. If treenails be used, every treenail must, if practicable, be a through fastening; and, if bolts be used, then one-sixth of them from the lower part of the bilge upwards must be through and clenched on the ceiling in addition to the butt bolts. In all cases of doubling, the rudder braces are to be removed.

2. The throat bolts of iron knees, and the bolts of iron hooks, crutches and pointers, must be renewed through the doubling.

3. The thickness of the doubling for the wales and bottom, on ships

Under 400 tons to be not less than	...	...	...	...	2 inches
of 400 „ and under 600 tons	...	...	...	...	2½ „
of 600 „ and above	...	...	...	...	3 „

4. On the topsides of ships not exceeding 300 tons, the thickness may be 1½ inches.

5. No ship hereafter doubled shall be entitled to the Character A, or A in Red, unless at the time of doubling it be ascertained, in either case, that the frame is capable of securely retaining the fastenings, *by*

* For doubling of Ships of the above class, see Section 68.

† In cases where ships have been doubled with doubling of less thickness than is required by, or not fastened in accordance with, the Rules, it will not be imperative that such doubling be stripped at the expiration of seven years, as required for ordinary sheathing; but, if, upon Survey, the doubling be found in good condition, the period for its remaining on may be extended, with the sanction of the Committee, to a term not exceeding ten years, provided the doubling below the wales be copper or yellow metal fastened or treenailed.

‡ In ships hereafter doubled and sheathed with copper or yellow metal, if the doubling be fastened exclusively with bolts, the same must be of copper or yellow metal.

If the doubling be fastened with treenails and bolts, as described in the above section, and the bolts be of iron, the vessel must be subjected to a Special Survey, and bolts at the discretion of the Surveyor be driven out to ascertain their condition; such surveys to be held within periods not exceeding three years, and whenever the copper or yellow metal sheathing is stripped.—6th July, 1876.

one treenail being driven out in every alternate frame or fourth timber between the upper edge of the wales and the light water-mark, and at such other parts of the bottom as the Surveyors may direct, so as to enable a judgment to be formed as to the general state of treenails and timbers, and of the planking in the treenail holes, or should the state of the treenails indicate defective timbers, or should the outside planking be bolt-fastened, then, by cutting out listings or plank at the discretion of the Surveyor.

6. Before doubling, the original fastenings in the outside planking and the rider bolts should be ascertained to be in efficient condition, or be made good, but all treenails, from the upper part of chocks at second futtock-heads to the lower part of chocks at floor-heads to be renewed with through treenails of hard wood for at least half the length of the ship amidships, unless the Surveyors, by having a sufficient number driven out, fully satisfy themselves that they are well made, tightly driven, and in good condition.

DIAGONAL DOUBLING.

7. If the doubling be applied diagonally, on the wales and bottom, it will be allowed to be of the following thicknesses, viz. :—

In ships under 500 tons	...	...	...	...	$1\frac{1}{2}$ inches
„ of 500 tons and under 1,000 tons	...	...	...	2 „	"
„ 1,000 tons and upwards	...	...	...	$2\frac{1}{2}$	"

8. Diagonal doubling on ships is to be fastened as under, viz. :—

9. If worked not above 11 inches broad, it may be single fastened with a through bolt at every butt, every fifth fastening to be a through bolt or a through treenail of hard wood; the distance between these through fastenings not to exceed 4 ft. 6 in. The remaining fastenings to consist of through treenails or two long and two short dump bolts; the length of the short dumps may be half an inch less than the combined thickness of the doubling and the original outside plank, and that of the long dumps to be not less than the thickness of the doubling added to twice the thickness of the original outside plank.

10. At the upper edge of the doubling, which is to be sufficiently high to enable the butt bolts of the diagonal planks to pass through the lower deck spirketting, a strake of planking is to be taken out fore and aft, and a strake is to be worked in its place, on the timbers, sufficiently thick to project to the outside of the doubling. The butts of the diagonal doubling are then to be rabbeted into this thick strake; or a fore and aft strake of doubling may be worked below the thick strake, and be rabbeted into it, and the butts of the diagonal doubling may be butted against this fore and aft strake. Or, if the strake of planking is not removed and the thick strake is not worked, there must be at the upper end of the diagonal doubling a fore and aft strake, having its upper edge let into the original plank sufficient to form a caulking seam, say not less than $1\frac{1}{2}$ inches. The lower ends of the diagonal doubling to be worked against two strakes of fore and aft doubling, the lower edge of the lower strake being rabbeted into the keel, and to be not less in thickness than one and a half times the thickness of the doubling. All diagonal doubling to be of rock elm or of equally suitable material, and be wrought on hair felt.

EXTENSION OF CLASS FOR DIAGONAL DOUBLING.

11. Ships diagonally doubled in conformity with the Rules, after the expiration of twelve months from the date of launching, shall be allowed an extended period of classification to the extent described hereafter.

12. Also ships surveyed for Continuation, Restoration, and the Character A 1 in Red, which shall be diagonally doubled in conformity with the rules, shall, on account of such doubling, be allowed an extension of the term otherwise assigned to them as under, viz. :—

13. Ships built of wood materials of the 5 years' grade and under, shall be allowed 2 years additional on account of being doubled diagonally; those built of materials exceeding the 5 and under the 12 years' grade, shall be allowed 3 years additional; and those built of 12 years' materials, 4 years additional.

14. To entitle ships to the advantages of this Rule when surveyed for Continuation, under Survey No. 2, Section 54, or for A in Red under Second Survey, Section 60, it will be necessary, in addition to the other requirements of the Rules, that in *flush-decked Vessels* the planksheer be removed on each side all fore and aft, so as to expose the heads of the timbers and the back of waterways to view; also that a strake of upper deck next the waterway be taken out all fore and aft, and the beams of the decks below be tested by boring and sounding. But in ships having a poop and forecastle, it will be necessary to remove the planksheer on both sides from the poop to the forecastle, and the mouldings in continuation of the planksheer forward and aft; or a portion of a strake of topside planking from the fore part of the poop aft, and from the after part of the forecastle forward; but it will not be necessary to remove planking of topsides from poop to forecastle where the planksheer has been removed, if the timbers thus exposed are in good condition; nor the strake of deck abaft the first beam within the poop and before the first beam within the forecastle, provided the beams are tested by boring and sounding and be found good.

15. If a ship be doubled at the time she undergoes the Continuation Rule, 1st Survey, or the 1st Rule for A in Red, the removal of a strake all fore and aft at the upper edge of the doubling may be substituted for the removal of the planksheer.

16. A similar relaxation of the Rule will, upon special application to the Committee, be allowed in the case of spar-decked ships.

FURTHER EXTENSION OF CLASS FOR DIAGONAL DOUBLING.

17. Ships which have been diagonally doubled in conformity with the Rules, Section 68, and have received an extension of class from the same, may, at a subsequent period, either on the expiration of the period of continuation under the second rule, or of Restoration, or of second continuation upon Restoration, or second Survey for A 1 in red, receive a *further extension* of class for diagonal doubling, provided the following Survey be complied with, and the vessel be found or placed in good and efficient condition.

18. The period of this *further extension* to be 3 years in the case of vessels built of materials of the 12 years' grade and above, and 2 years in the case of vessels where the timber materials are below the 12 years' grade.

SURVEY.

19. The ship to be placed on blocks in dry dock, or on ways, so that the keel and bottom may be seen and properly examined (unless she has been thus surveyed by the Society's officers within the previous twelve months); the hold to be cleared, and proper stages made both inside and outside; the limbers, and all air-courses to be cleared; and, if the ship has not already got the air-courses described in Section 37, they are now to be made; the outside planking to be scraped bright where the Surveyors may consider it to be necessary from any apparent defects; bolts of lower deck (if through of iron) in number

not less than three on each side, and treenails in number not less than twelve on each side, to be driven out at various parts of the ship, and all parts of the ship, and the equipment to be thoroughly examined, in order to ensure the vessel being in good and efficient condition, and worthy of the extension of class herein contemplated.

20. Such Ships to be marked in the Register Book thus:—dia. d. 3 yrs. or 2 yrs., as the case may be.

DOUBLING OF VESSELS CLASSED \AA and E.

21. All vessels of the \AA or E class, or vessels unclassed, which may be found on Survey to be, from *local* defects, in a condition requiring considerable opening out and consequent repairs, to entitle them to a class in the Register Book, or to continue on their class, may be rendered eligible for classification, or for the \AA character, provided they be diagonally doubled, the thickness of the same being from one inch in thickness and upwards, according to the size of the vessel.

22. In all such cases, however, the local Surveyor should forward a report, setting forth the condition of all parts of the vessel, and the mode of doubling proposed to be adopted, for the sanction of the Committee.

23. A careful examination is to be made of the condition of the original fastenings, and the planking of the bottom, &c., before the doubling is fitted, and the Surveyors are to satisfy themselves that the timbers of the frame and planking are sufficiently sound to receive the fastenings.

24. When the doubling is under two inches in thickness it may be fastened with short bolts, spikes or nails, galvanized, on the alternate edges not exceeding twelve inches apart; the length of the bolts, spikes or nails, may be one inch less than the combined thickness of the doubling and outside planking with longer intermediate bolts in the butts and about five feet apart, driven into the timbers of the frame.

25. When the doubling is two inches in thickness or above, in addition to the above fastenings, the butt bolts must be through and clenched.

26. The doubling in all cases is to be rabbeted into the stem, stern-post, and keel and a stake of longitudinal doubling is to be fitted adjoining the keel, and to be one-half an inch thicker than the diagonal doubling, if the latter be two inches or less in thickness.

27. Should the \AA character be then assigned, the same will be continued, subject to annual Survey, provided once in every four years the keel and bottom be surveyed, and the caulking tested, and the hold cleared; the windlass unhung and chain cables ranged, and the equipments and general condition of the vessel be found satisfactory. (For periodical Surveys of ships classed E, see Section 65.)

28. Where modifications are desired, Shipowners may submit their proposals for the approval of the Committee through the resident Surveyor.

IRON-FASTENED SHIPS.

Section 69. All ships, although iron-fastened (except as hereinafter mentioned), shall be classed in the same manner as copper-fastened ships, so long as they remain unsheathed with copper, provided they are, in all other respects, constructed in accordance with the Rules; but, when sheathed with copper over the iron fastenings, the words "Coppered over Iron Bolts" shall be added to the Character in the Register Book, and continued until the ship be thoroughly copper-fastened.

SHIPS BUILT IN INDIA.

Section 70. Ships built in India, although fastened with iron, shall be permitted to be copper-sheathed without any mark being placed in the book, provided the bottom be felted or chunamed and wood-sheathed, and subjected to a careful examination of the iron fastenings on every occasion on which the sheathing is stripped off, for which purpose some of the bolts and nails are to be taken out of the lower part of the bottom, and to be seen by the Surveyor; but no such ship shall be permitted to continue either on the A or on the A in Red class for a longer period than one-half the number of years beyond the term originally assigned for her remaining on the A Character, unless the bottom shall have been doubled, or the whole of the iron fastenings taken out or properly secured, and the bottom refastened with bolts, or treenails, or both, including the middle line, breast-hook, and crutch bolts. (*See Section 67.*)

RUDDER, PUMPS, WINDLASS, HAWSE-PIPE, &c.

Section 71. 1. The rudder, pumps, windlass, or capstan, scuppers, hawse-pipes, chain-plates, and side-lights to be good and efficient; and the windlass, if of wood, is in all cases to have a through square iron spindle, ranging from $2\frac{1}{2}$ to 5 inches square, according to tonnage.

2. The hawse-pipes must be of sufficient size and thickness, and the outside flange of proper form to admit of an easy lead for the cable to the windlass, or capstan.

3. All hand pumps to be capable of being worked from the upper or main decks above the deep Load Water Line, the bottom of the pump chambers are not to be more than 24 feet above the suction rose, and the pumps are to be tested by the Surveyors to ensure that water can be pumped from the limbers. The sizes of the hand pumps to be not less than those given in the following Table:—

Tonnage under Upper Deck.	Hand Pumps in Holds.	
	Diameter of Barrel. Inches.	Diameter of Tail Pipe. Inches.
In vessels under 500 tons...	4	2
In vessels of 500 tons but under 1,000 tons	$4\frac{1}{2}$	$2\frac{1}{4}$
In vessels of 1,000 tons but under 2,000 tons...	5	$2\frac{1}{2}$
In vessels of 2,000 tons and above	$5\frac{1}{2}$	$2\frac{3}{4}$

In lieu of hand pumps in each compartment an approved fly wheel pump may be fitted if it is connected to the steam pump bilge suction pipes of these compartments.

EQUIPMENT.

Section 72. 1. All vessels having masts, spars, rigging, and sails, shall be required to have them maintained in good order.

2. Every ship is to be provided with anchors, cables, &c., of approved quality, properly tested at a public machine recognised by the Committee, in number and length, as set forth in the Tables, Nos. 30 and 31. (*See also Section 32.*)

3. In the cases of *foreign owned vessels* classed with the Figure 1, in which the chains and anchors, or part of the same, have been tested under the inspection of the Society's Surveyors at Proving Establishments out of the United Kingdom recognised by the Committee, and test certificates of the same are furnished, duly signed, by the Society's Surveyors, the vessel will have recorded in the Register Book the notation A.&C.P., A.P. or C.P. as the case may be. Where, however, the anchors or cable for *foreign owned vessels* are manufactured abroad, and test certificates are furnished setting forth that they have been tested at a Government machine, or at a machine under the control of a municipal body, or a similar responsible body, but not under the inspection of a Surveyor to the Society, the record of A.&C.P., &c., will not be made in the Register Book, though such certificates will be accepted, as complying with the requirements of the Rules, for assigning the Figure 1, provided the remaining requirements of Tables 30 and 31 be complied with.

4. A Certificate of all Chains and Anchors having been tested, and of the strain applied to them, must be produced before the ship is classed with the Figure 1.

Section 73. The length and condition of the Chain Cables are to be ascertained by removal from the lockers on every Special Survey for Classification.

Section 74. In all cases where hempen cables are used, one-sixth more in length will be required.

BOATS.

Section 75. All vessels under 150 tons to be provided with one good boat; and every vessel of 150 tons and above to have a suitable number. The Surveyors are to be particular in examining and reporting the condition of the boats of *all* vessels.

Section 76. 1. The efficient state and condition of the whole of the ship's equipment will be designated by the Figure 1 placed after the character assigned to the vessel; and in cases in which the equipment is found insufficient in quantity, or defective in quality, a dash thus — will be inserted in place of the Figure 1. In cases where the Figure 1 is expunged on account of deficiencies in the anchors or chains, the record of L.A.&C.P. or A.&C.P. will also be expunged.

SHIPS NAVIGATED BY STEAM.

Section 77. Steam ships are to be subject to the same periodical surveys as sailing vessels, and whenever the boilers are taken out the vessel is to be submitted to a particular and special Survey, in order to ascertain her general condition. (*See Rules for Machinery.*)

HULL.

Section 78. The Surveyors are directed to examine and report the scantling of timbers, planks and fastenings, and to state where built, and by whom, in the same manner as directed for sailing vessels.

Section 79. The Surveyors are required to report the number, size, length, fastenings, and mode of arrangement of the engine and boiler *sleepers*, and the description of timber of which they are composed, and whether diagonally trussed with wood or iron, and to what extent; the length, size, and fastenings of shelf-pieces and paddle-beams; and whether the vessel is constructed with sponsons, and how they are formed; and to give the length and shifting of the planks outside and inside.

EQUIPMENT.

Section 80. 1. The Surveyors are to examine and report the number and description of the masts, spars, sails, anchors, cables, hawsers, warps, and boats, as directed to be done for sailing vessels. For weight of anchors, size and length of chains, see Table Nos. 30 and 31 and Section 32, also Sections 72 to 76.

BOATS.

Section 81. The Surveyors are to be particular in examining and reporting the condition of the boats of all vessels. (*See* Section 75.)

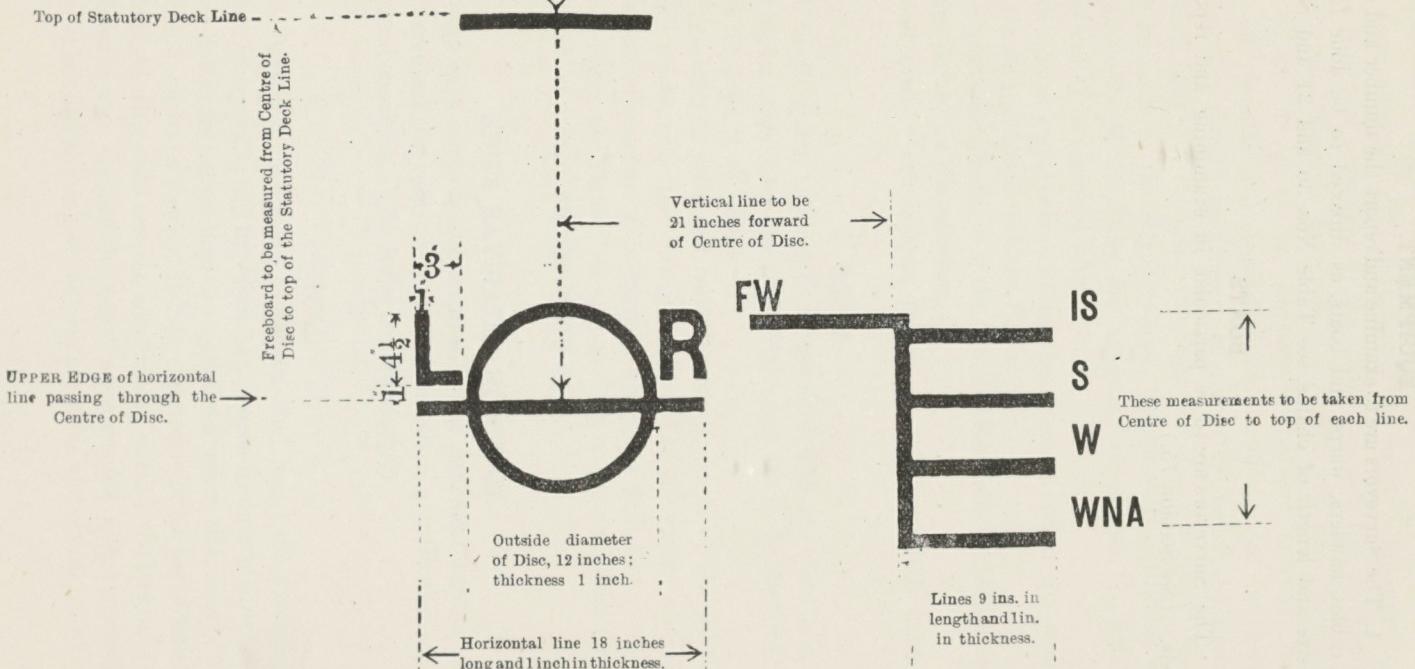
FREEBOARD.

ASSIGNMENT OF FREEBOARD.

Under the Merchant Shipping Act, 1894, the Committee of Lloyd's Register are empowered to assign freeboards to British Vessels as required by the Act. Forms of application for the assignment of freeboard can be obtained from the London, or other, offices of the Society.

The mode of Marking, approved by the Board of Trade, is as follows:—

FREEBOARD MARKING FOR STEAMERS.

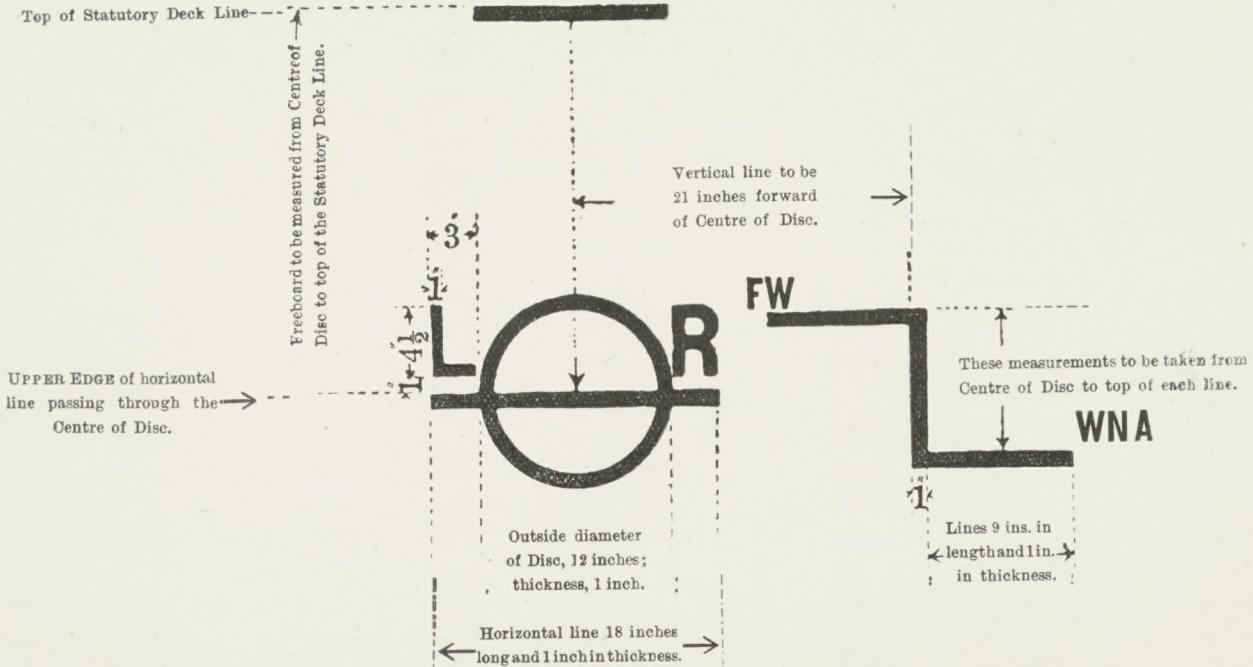


The Centre of Disc to be placed on both sides of vessel amidships, i.e., at the middle of the length of the load water line. Vessels are to be marked with such of the horizontal lines as are applicable to the nature of their employment. In accordance with the Regulations made by the Board of Trade, the discs and lines must be permanently marked by centre punch marks or cutting, and the particulars given in the Certificate are to be entered in the official log.

N.B.—It is a condition on which an awning or shelter deck or partial awning deck vessel is classed in the Society's Register Book that the Freeboard assigned shall be marked on the vessel's sides as above prescribed; and, under the provisions of Section 44 of the Society's Rules for Steel Ships. If the vessel proceed to sea with a less freeboard than that approved by the Committee, or if the freeboard mark be placed higher than the position assigned by the Committee, the vessel will be liable to have her class expunged from the Register Book.

FREEBOARD—*continued.*

FREEBOARD MARKING FOR SAILING VESSELS.



The Centre of Disc to be placed on both sides of vessel amidships, i.e., at the middle of the length of the load line. Coasting vessels are required to be marked with only the maximum load line in fresh water. In accordance with the regulations made by the Board of Trade, the disc and lines must be permanently marked by centre punch marks or cutting, and the particulars given in the Certificate are to be entered in the official log.

TABLES 30 & 31

EQUIPMENT

FOR

SAILING VESSELS AND

CHAINS AND ANCHORS FOR SAILING VESSELS. TABLE 30.

(See Continuation.)

Minimum Weights of Anchors, ex. Stock; Sizes, Lengths and Weights of Chains, and the Proof Strain to which they are to be tested per Chain Cables and Anchor Acts. Also sizes and Lengths of Towlines, Hawsers and Warps. The Anchors and the links of the Chains to be of unexceptionable form and proportions.

Equipment Numbers for IRON AND STEEL Vessels. See Note (a).	Letters for Equipment as inserted in Register Book, Column 8.	ANCHORS.												CHAIN CABLES, HAWSERS, &c.										
		GROSS TONNAGE LESS CREW SPACE. See Note †			NUMBER.	BOWER (b) ANCHORS. (d)			STREAM AND KEDGE ANCHORS. (b) (d)			STUD-CHAIN CABLES (e) (f) (h).												
		Bowers.	Stream.	Kedge.		Weight.	Test. *	Collective Weight	Stream.	Test. *	Kedge.	Test. *	Length.	Minimum Size.	Proved to Statutory Test.	Breaking Test.	Minimum Weight.							
		Above	Tons.	not exceeding	Above	Cwts.	Tons.	Owts.	Owts.	Tons.	Owts.	Tons.	Fathoms.	Inches.	Tons.	Tons.	Owts.	qrs.	lbs.					
1600 and	2100	a	50	and	75	2	1	1	3½	5½	7	¾	—	½	—	120	11	8	10	12	3	29	0	14
2100 ,,	2500	b	75	,,	100	2	1	1	4½	6½	8½	1¼	3½	½	—	120	12	10	8	15	1	34	2	7
2500 ,,	3000	c	100	,,	125	2	1	1	5	7½	10	1½	3½	¾	—	135	13	11	8	17	10	45	3	3
3000 ,,	3400	d	125	,,	150	2	1	1	5½	8	11½	1½	3½	¾	—	165	14	13	¾	20	5	64	1	11
3400 ,,	3900	e	150	,,	175	2	1	1	6½	8½	13	2	4½	1	—	165	15	15	8	23	10	74	1	26
3900 ,,	4300	f	175	,,	200	2	1	1	7½	9½	14½	2½	4½	1	—	165	1	18	—	27	—	84	0	17
4300 ,,	4800	g	200	,,	250	3	1	1	8½	10½	23½	2½	5	1½	3½	165	11	20	3	30	4	95	1	9
4800 ,,	5300	h	250	,,	300	3	1	1	10	12	28½	3½	6½	1¾	4½	195	12	22	3	34	1	126	1	0
5300 ,,	5900	i	300	,,	350	3	1	1	12	13½	34½	4	6½	2	4½	195	13	25	3	38	—	141	0	16
5900 ,,	6500	j	350	,,	400	3	1	1	13½	15½	38½	4½	7½	2½	5	210	14	28	½	42	1	168	0	0
6500 ,,	7100	k	400	,,	450	3	1	1	15½	16½	43½	5½	7½	2½	5	210	15	31	—	46	½	185	2	12
7100 ,,	7700	l	450	,,	500	3	1	1	17	18½	48½	5½	7½	2½	5½	240	16	34	51	232	0	21	—	21
7700 ,,	8400	m	500	,,	600	3	1	1	19	19½	54	6½	8½	3½	5½	240	17	37	½	55	5	254	0	19
8400 ,,	9200	n	600	,,	700	3	1	1	21	21½	60	7½	9½	3½	5½	240	18	40	5	58	7	276	2	14
9200 ,,	10100	o	700	,,	800	3	1	1	23½	23½	67	8	10½	4	6½	270	19	43	9	61	4	336	0	0
10100 ,,	11100	p	800	,,	900	3	1	1	25½	25½	72½	8½	10½	4½	6½	270	10	47	5	66	5	359	1	9
11100 ,,	12300	q	900	,,	1000	3	1	1	27½	26½	79	8½	10½	4½	6½	270	11	51	½	71	4	387	3	4
12300 ,,	13600	r	1000	,,	1200	3	1	1	30	28½	85½	9½	11½	4½	7½	270	12	55	½	77	½	416	3	0
13600 ,,	15100	s	1200	,,	1400	3	1	1	32	30½	91½	10½	12½	5½	7½	270	13	59	½	82	3	447	2	3
15100 ,,	16800	t	1400	,,	1600	3	1	1	34	31½	97	10½	12½	5½	7½	270	14	63	½	88	5	478	1	18
16800 ,,	18600	u	—	—	—	3	1	1	36½	33½	104	11½	13½	5½	7½	270	15	67	5	94	5	511	1	14
18600 ,,	20500	v	—	—	—	3	1	1	38	34½	108½	11½	13½	5½	8	270	2	72	—	100	8	538	3	0
20500 ,,	22700	w	—	—	—	3	1	1	40	35½	114	12	13½	6	8½	270	2½	76	5	107	1	573	2	14
22700 ,,	25200	x	—	—	—	3	1	1	42	37½	119½	13½	15½	6½	9	300	2½	86	½	120	5	717	2	0
25200 ,,	27900	y	—	—	—	3	1	1	45	39½	128½	15½	16½	7½	9½	300	2½	96	½	134	3	800	3	14
27900 ,,	30800	z	—	—	—	3	1	1	48	41½	137	17	18½	8½	10½	300	2½	101	½	142	1	844	1	0

N.B.—For Notes to the above Table, and Equipment of Trawlers and Tugs, see back of Table 31 and following pages.

CHAINS AND ANCHORS FOR SAILING VESSELS. TABLE 30.

(Concluded.)

Minimum Weights of Anchors, ex. Stock; Sizes, Lengths and Weights of Chains, and the Proof Strain to which they are to be tested per Chain Cables and Anchors Acts. Also Sizes and Lengths of Towlines, Hawsers and Warps. The Anchors and the links of the Chains to be of unexceptionable form and proportions.

Equipment Numbers for IRON AND STEEL Vessels. See Note (a).		Letters for Equipment as Inserted in Register Book, Column 8.	GROSS TONNAGE LESS CREW SPACE. See Note †		Length.	CHAIN CABLES, HAWSERS, &c.												HAWRSERS, AND WARPS.		
						STREAM, CHAIN OR STEEL WIRE (e) (g).						TOWLINE: HEMP OR STEEL WIRE (i)								
						Size.	CHAIN.			STEEL WIRE (i)			Size.	Breaking Test.	Length.	HEMP.	STEEL WIRE.	Size.	Breaking Test.	
Above	not exceeding		Above	not exceeding	Fathoms.	Inches.	Owts.	qrs.	lbs.	Owts.	qrs.	lbs.	Inches.	Tons.	Fathoms.	Inches.	Inches.	Tons.	Ins.	Ins.
1600	and 2100	a	50	and 75	45	7 16	5	1	0	5	3	0	—	—	75	5	1 3/4	5 1/2	3	—
2100	„	b	75	„	100	45	8 16	6	2	0	7	1	0	—	—	75	5 1/2	2	7	3
2500	„	c	100	„	125	45	8 16	6	2	0	7	1	0	—	—	75	5 1/2	2	7	3
3000	„	d	125	„	150	45	8 16	6	2	0	7	1	0	—	—	75	6	2 1/4	9 1/2	3 1/2
3400	„	e	150	„	175	45	9 16	8	0	0	8	3	0	2	7	75	6 1/2	2 1/4	9 1/2	4
3900	„	f	175	„	200	45	9 16	8	0	0	8	3	0	2	7	75	6 1/2	2 1/4	9 1/2	4
4300	„	g	200	„	250	45	10 16	9	3	0	10	2	0	2 1/4	9 1/2	75	7	2 1/2	12 1/2	4
4800	„	h	250	„	300	45	10 16	9	3	0	10	2	0	2 1/4	9 1/2	75	7 1/2	2 1/2	12 1/2	5
5300	„	i	300	„	350	60	11 16	14	2	7	15	3	7	2 3/4	15 1/2	75	8	2 3/4	15 1/2	5 1/2
5900	„	j	350	„	400	60	11 16	14	2	7	15	3	7	2 3/4	15 1/2	75	8	2 3/4	15 1/2	5 1/2
6500	„	k	400	„	450	60	12 16	17	1	3	18	3	3	2 3/4	15 1/2	75	8 1/2	2 3/4	15 1/2	6
7100	„	l	450	„	500	60	12 16	17	1	3	18	3	3	2 3/4	15 1/2	75	9	3	18	6 1/2
7700	„	m	500	„	600	60	13 16	20	1	11	22	0	11	3	18	75	9 1/2	3 1/4	22	7
8400	„	n	600	„	700	60	13 16	20	1	11	22	0	11	3	18	90	10	3 1/4	22	7
9200	„	o	700	„	800	60	14 16	23	1	17	25	1	17	3 1/4	22	90	10	3 1/4	22	8
10100	„	p	800	„	900	75	1 4/6	29	1	0	31	2	0	3 1/4	22	90	10	3 1/4	22	8
11100	„	q	900	„	1000	75	1 5/6	33	3	11	36	1	11	3 1/2	26	90	10 1/2	3 1/4	22	9
12300	„	r	1000	„	1200	75	1 5/6	33	3	11	36	1	11	3 1/2	26	90	10 1/2	3 1/4	22	9
13600	„	s	1200	„	1400	75	1	38	1	0	41	1	0	3 3/4	29	90	11	3 1/2	26	9 1/2
15100	„	t	1400	„	1600	75	1	38	1	0	41	1	0	3 3/4	29	90	11	3 1/2	26	10
16800	„	u	—	—	75	1 1/6	43	1	9	46	1	9	4	33	90	11	3 1/2	26	10 1/2	
18600	„	v	—	—	75	1 1/6	43	1	9	46	1	9	4	33	90	12	4	33	11	
20500	„	w	—	—	100	1 2/6	64	2	27	69	2	3	4 1/4	35	90	12	4	33	11	
22700	„	x	—	—	120	1 2/6	77	2	21	83	1	21	4 1/4	35	90	13	4 1/2	39	12	
25200	„	y	—	—	120	1 3/6	86	3	12	93	0	12	4 1/2	39	90	13	4 1/2	39	12	
27900	„	z	—	—	120	1 4/6	96	0	0	103	0	0	4 3/4	47	120	14	4 3/4	47	13	

N.B.—For Notes to the above Table, and Equipment of Trawlers and Tugs, see back of Table 31 and following pages.

LLOYD'S REGISTER OF SHIPPING, LONDON.—11th December, 1913.

CHAINS AND ANCHORS FOR STEAM VESSELS.

(See Continuation.)

Minimum Weights of Anchors, ex. Stock and Stockless; Sizes, Lengths and Weights of Chains, and the Proof Strain to which they are to be tested per Chain Cables and Anchors Act. Also Sizes and Lengths of Towlines, Hawsers and Warps. The Anchors and the links of the Chains to be of unexceptionable form and proportions.

Equipment Numbers for IRON AND STEEL Vessels. See Note (a)	Letters for Equipment as inserted in Register Book, Column 7.	GROSS TONNAGE LESS CREW SPACE. See Note † Tons.	NUM- BER.	ANCHORS.												CHAIN CABLES, HAWSERS, &c.															
				BOWER ANCHORS (b) (d)						STREAM AND KEDGE ANCHORS (b) (c) (d)						STUD-CHAIN CABLES (e) (f) (h)															
				Ex. Stock.			Stockless.			Ex. Stock.			Stockless.			Ex. Stock.			Stockless.			Fms.		Ins.		Tons.		Tons.		Owts.	q. lbs.
				Bowers	Stream	Kedge.	Weight.	Test.*	Collective Wghts.	Weight.	Test.*	Collective Wghts.	Stream.	Test.*	Kdge.	Weight.	Test.*	Lgth.	Min- imum Size.	Proved to Statutory Test.	Breaking Test.	Minimum Weight.									
Above 2400 and not exceeding 3000	a	Above not exceeding 80 and 115	211	Cwts. 3 ₂	Tons. 5 ₁ ^{8₂₀}		7	4 ₁	6 ₁ ⁷ ₂₀	8 ₃ ₄	—	3	—	1 ₂	—	120	1 ₁ ₆	8 ₅ ₁₀	12 ₃ ₄	29 ₀ ₁₄											
3000, 3600	b	115, 150	211	4 ₁	6 ₁ ² ₂₀		8 ₁ ₂	5 ₁ ₄	7 ₁ ₁ ₂₀	10 ₁ ₂	1 ₁ ₄	3 ₁ ₃ ₂₀	2 ₁ ₂	—	120	1 ₁ ₆	10 ₁ ₈	15 ₁ ₈	34 ₂ ₇												
3600,	c	150, 185	211	5	7 ₂ ₀		10	6 ₁ ₄	8 ₁ ₀ ₂₀	12 ₁ ₂	1 ₃ ₄	4 ₂ ₀	3	—	135	1 ₁ ₆	11 ₇ ₈	17 ₁ ₀	45 ₃ ₃												
4200,	d	185, 230	211	5 ₃ ₄	8		11 ₁ ₂	7 ₄	9 ₉ ₂₀	14 ₁ ₄	2 ₁ ₄	4 ₁ ₅ ₂₀	3	—	165	1 ₄ ₆	13 ₃ ₄	20 ₅ ₈	64 ₁ ₁₁												
4800,	e	230, 275	211	6 ₁ ₂	8 ₁ ₅ ₂₀		13	8 ₄	10 ₇ ₂₀	16 ₁ ₄	2 ₃ ₄	5 ₂ ₀	1	—	165	1 ₅ ₆	15 ₁ ₀	23 ₁ ₀	74 ₁ ₂₆												
5400,	f	275, 325	211	7 ₁ ₄	9 ₉ ₂₀		14 ₂	9	11 ₂ ₂₀	18	3	5 ₁ ₀ ₂₀	1 ₁ ₄	3 ₁ ₃ ₂₀	165	1	18	27	84 ₀ ₁₇												
6000,	g	325, 380	311	8 ₁ ₄	10 ₇ ₂₀		23 ₂	10 ₁ ₄	12 ₄ ₂₀	29 ₁ ₄	3 ₂ ₂	5 ₁ ₈ ₂₀	1 ₁ ₂	3 ₁ ₈ ₂₀	165	1 ₁ ₆	20 ₃ ₁₀	30 ₄ ₁₀	95 ₁ ₉												
6700,	h	380, 435	311	10	12		28 ₁ ₂	12 ₂ ₁ ₄ ₂₀	35 ₁ ₂	4	6 ₇ ₂₀	1 ₃ ₄	4 ₂ ₀	195	1 ₂ ₆	22 ₃ ₄	34 ₁ ₈	126 ₁ ₀													
7400,	i	435, 500	311	11 ₃ ₄	13 ₁ ₂ ₂₀		33 ₂	14 ₂ ₁	16 ₂ ₂₀	41 ₄ ₃	4 ₁ ₄	6 ₁ ₂ ₂₀	2	4 ₁ ₀	195	1 ₃ ₆	25 ₃ ₈	38	141 ₀ ₁₆												
8100,	j	500, 580	311	13 ₁ ₂ ₂₀	15 ₃ ₂₀		38 ₁ ₂	16 ₃ ₄	18	48	4 ₃ ₄	7 ₂ ₀	2 ₄	4 ₁ ₅ ₂₀	210	1 ₄ ₆	28 ₁ ₈	42 ₁ ₈	168 ₀ ₀												
8900,	k	580, 680	311	15 ₁ ₄	16 ₁ ₄ ₂₀		43 ₂ ₁	19	19 ₁ ₂₀	54 ₁ ₄	5 ₁ ₄	7 ₁ ₂ ₂₀	2 ₁ ₂	5	210	1 ₅ ₆	31	46 ₁ ₂	185 ₂ ₁₂												
9700,	l	680, 790	311	17	18 ₅ ₂₀		48 ₁ ₂	21 ₁ ₄	21 ₁ ₆	60 ₁ ₂	5 ₃ ₄	8 ₂ ₀	2 ₄	5 ₂ ₀	210	1 ₆ ₆	34	51	203 ₀ ₁₈												
10600,	m	790, 910	311	18 ₃ ₄	19 ₁ ₃ ₂₀		53 ₁ ₂	23 ₁ ₄	23 ₆ ₂₀	66 ₃ ₄	6	8 ₅ ₂₀	3	5 ₁ ₀ ₂₀	210	1 ₇ ₆	37 ₁ ₈	55 ₅ ₈	222 ₁ ₁₇												
11600,	n	910, 1040	311	20 ₂ ₁	21 ₃ ₂₀		58 ₁ ₂	25 ₃ ₂ ₂₀	73	6 ₁ ₂	8 ₁ ₅ ₂₀	3 ₁ ₂	6 ₁ ₀	3 ₁ ₈ ₂₀	210	1 ₈ ₆	40 ₅ ₁₀	58 ₇ ₁₀	242 ₀ ₅												
12700,	o	1040, 1200	311	22 ₁ ₂	22 ₁ ₅ ₂₀		64	28	27 ₂ ₀	80	7	9 ₂ ₀	4	6 ₇ ₂₀	240	1 ₉ ₆	43 ₉ ₁₀	61 ₁ ₀	298 ₂ ₁₉												
13900,	p	1200, 1380	311	24 ₁ ₂	24 ₆ ₂₀		69 ₁ ₂	30 ₁ ₂	29	87	7 ₃ ₄	9 ₁ ₈ ₂₀	4 ₁ ₄	6 ₁ ₂ ₂₀	240	1 ₁ ₆	47 ₅ ₁₀	66 ₁ ₀	319 ₁ ₁₇												
15200,	q	1380, 1580	311	26 ₁ ₂	26		75	33	30 ₁ ₂₀	94	8 ₁ ₂	10 ₁ ₂ ₂₀	4 ₂ ₁	6 ₁ ₇ ₂₀	240	1 ₁ ₆	51 ₁ ₄	71 ₃ ₄	344 ₂ ₂₂												
16700,	r	1580, 1820	311	28 ₁ ₂	27 ₁ ₀ ₂₀		81	35 ₁ ₂	32 ₁ ₅ ₂₀	101	9 ₁ ₄	11 ₆ ₂₀	4 ₃ ₄	7 ₂ ₂ ₂₀	240	1 ₁ ₆	55 ₁ ₈	77 ₁ ₈	370 ₁ ₂₂												
18500,	s	—	311	31	29 ₇ ₂₀		88	38 ₃ ₄	34 ₁ ₉ ₂₀	110	10	12	5	7 ₇ ₂₀	240	1 ₁ ₆	59 ₁ ₈	82 ₃ ₄	397 ₃ ₆												
20600,	t	—	311	33 ₁ ₂	31 ₅ ₂ ₂₀		95 ₁ ₂	42	37 ₂ ₀	119 ₁ ₂	11	12 ₁ ₇ ₂₀	5 ₁ ₄	12 ₁ ₇ ₂₀	240	1 ₁ ₆	63 ₁ ₄	88 ₅ ₁₀	425 ₁ ₀												
22700,	u	—	311	36	33 ₂ ₀		103	45	39 ₅ ₂ ₂₀	128	12	13 ₂ ₀	5 ₁ ₂	13 ₂ ₀	270	1 ₁ ₆	67 ₁ ₀	94 ₅ ₁₀	511 ₁ ₁₄												
25000,	v	—	311	39	35 ₂ ₀		111	48 ₃ ₄	41 ₁ ₁ ₂₀	139	13	14 ₁ ₅ ₂₀	5 ₃ ₄	8	270	2	72	100 ₈ ₀	538 ₃ ₀												
27300,	w	—	311	42	37 ₂ ₀		119 ₁ ₂	52 ₁ ₂	43 ₁ ₈ ₂₀	149 ₁ ₂	14	15 ₁ ₂ ₂₀	6	8																	

CHAINS AND ANCHORS FOR STEAM VESSELS.

TABLE 31.

(Concluded.)

Minimum Weights of Anchors, ex. Stock and Stockless; Sizes, Lengths and Weights of Chains, and the Proof Strain to which they are to be tested per Chain Cables and Anchors Act. Also Sizes and Lengths of Towlines, Hawsers and Warps. The Anchors and the links of the Chains to be of unexceptionable form and proportions.

Equipment Numbers for IRON AND STEEL Vessels. See Note (a)	Letters for Equipment, as inserted in Register Book, Column 7.	GROSS TONNAGE LESS CREW SPACE. See Note † Tons.	CHAIN CABLES, HAWSERS, &c.															
			STREAM, CHAIN or STEEL WIRE (e) (g)												TOWLINE: HEMP OR STEEL WIRE (i)			
			Length.	Size.	CHAIN.			STEEL WIRE (i)	Length.	Size.	Hemp.	Steel Wire.	Size of each.	Size of each.	Length of each.			
					Stud Link.	Short Link.												
Above 2400 and not exceeding 3000	a	Above 80 and not exceeding 115	45	8 1 6	6 2 0	7 1 0	—	—	75	5 1 2	2	7	3	—	—	90		
3000 „ 3600	b	115 „ 150	45	9 1 6	8 0 0	8 3 0	2	7	75	6 2 1 4	2 1 4	9 1 2	4	—	—	90		
3600 „ 4200	c	150 „ 185	45	9 1 6	8 0 0	8 3 0	2	7	75	6 2 1 4	2 1 4	9 1 2	4	—	—	90		
4200 „ 4800	d	185 „ 230	45	10 1 6	9 3 0	10 2 0	2 1 4	9 1 2	75	6 1 2	2 1 4	9 1 2	4	—	—	90		
4800 „ 5400	e	230 „ 275	45	10 1 6	9 3 0	10 2 0	2 1 4	9 1 2	75	7 2 1	2 1 2	12 1 2	5	—	—	90		
5400 „ 6000	f	275 „ 325	45	11 1 6	10 3 19	11 3 19	2 3 4	15 1 2	75	7 1 2	2 1 2	12 1 2	5 1 2	—	—	90		
6000 „ 6700	g	325 „ 380	60	11 1 6	14 2 7	15 3 7	2 3 4	15 1 2	75	7 1 2	2 1 2	12 1 2	5 1 2	—	—	90		
6700 „ 7400	h	380 „ 435	60	12 1 6	17 1 3	18 3 3	2 3 4	15 1 2	75	8 2 3	15 1 2	6	—	—	90			
7400 „ 8100	i	435 „ 500	60	13 1 6	20 1 11	22 0 11	3	18	75	8 1 2	2 3 4	15 1 2	6	—	—	90		
8100 „ 8900	j	500 „ 580	60	13 1 6	20 1 11	22 0 11	3	18	75	8 1 2	2 3 4	15 1 2	6	4	90			
8900 „ 9700	k	580 „ 680	60	14 1 6	23 1 17	25 1 17	3 1 2	22	90	9 3	18	6	5	90				
9700 „ 10600	l	680 „ 790	60	14 1 6	23 1 17	25 1 17	3 1 2	22	90	9 3	18	6	5	90				
10600 „ 11600	m	790 „ 910	60	15 1 6	27 0 9	29 0 9	3 1 2	26	90	9 1 2	3 1 4	22	6	5	90			
11600 „ 12700	n	910 „ 1040	75	15 1 6	33 3 11	36 1 11	3 1 2	26	90	10 3 1 4	22	6	5	90				
12700 „ 13900	o	1040 „ 1200	75	1	38 1 0	41 1 0	3 1 2	29	90	10 3 1 4	22	6	5	90				
13900 „ 15200	p	1200 „ 1380	75	1	38 1 0	41 1 0	3 1 2	29	90	10 3 1 4	22	2 of 6	2 of 5	90				
15200 „ 16700	q	1380 „ 1580	75	1 1 6	43 1 9	46 1 9	4	33	90	11 3 1 2	26	2 of 6	2 of 5	90				
16700 „ 18500	r	1580 „ 1820	75	1 1 6	43 1 9	46 1 9	4	33	90	11 3 1 2	26	2 of 6	2 of 5	90				
18500 „ 20600	s	—	75	1 2 6	48 2 6	52 0 6	4 1 4	35	90	12 4	33	2 of 7	2 of 6	90				
20600 „ 22700	t	—	75	1 2 6	48 2 6	52 0 6	4 1 4	35	100	12 4	33	2 of 7	2 of 6	90				
22700 „ 25000	u	—	90	1 2 6	58 1 2	62 1 2	4 1 4	35	100	12 4	33	2 of 7	2 of 6	90				
25000 „ 27300	v	—	90	1 3 6	65 0 16	69 2 16	4 1 2	39	120	12 4	33	2 of 7	2 of 7	90				
27300 „ 29700	w	—	90	1 3 6	65 0 16	69 2 16	4 1 2	39	120	13 4 1 2	39	2 of 7	2 of 7	90				
29700 „ 32200	x	—	90	1 3 6	65 0 16	69 2 16	4 1 2	39	120	13 4 1 2	39	2 of 7	2 of 7	90				
32200 „ 34800	y	—	90	1 4 6	72 0 0	77 0 0	4 3 4	47	120	14 4 3 4	47	2 of 8	2 of 7	90				
34800 „ 37600	z	—	90	1 4 6	72 0 0	77 0 0	4 3 4	47	120	14 5	59	2 of 8	2 of 7	90				
37600 „ 40400	a†	—	90	1 5 6	79 2 5	85 0 5	5 6	59	120	15 5 1 4	65	2 of 8	2 of 7	90				
40400 „ 43200	b†	—	120	1 5 6	106 0 7	113 1 7	5	59	130	15 5 1 2	71	2 of 8	2 of 8	100				
43200 „ 46000	c†	—	120	1 5 6	106 0 7	113 1 7	5	59	130	15 5 3 4	78	2 of 8	2 of 8	100				
46000 „ 48800	d†	—	120	1 6 6	116 0 10	124 0 10	5 1 4	65	130	16 6	85	2 of 8	2 of 8	100				
48800 „ 51600	e†	—	120	1 6 6	116 0 10	124 0 10	5 1 4	65	130	16 6	85	2 of 8	2 of 8	100				
51600 „ 54600	f†	—	120	1 7 6	126 3 0	135 2 0	5 1 2	71	130	16 6	85	2 of 8	2 of 8	100				
54600 „ 57600	g†	—	120	1 8 6	138 1 0	146 2 0	6	85	130	17 7	113	2 of 8	2 of 8	100				
57600 „ 60600	h†	—	120	1 8 6	138 1 0	146 2 0	6	85	130	7	113	2 of 8	2 of 8	120				
60600 „ 63800	i†	—	120	1 9 6	149 1 0	159 0 0	6	85	130	7	113	2 of 8	2 of 8	120				
63800 „ 67000	j†	—	120	1 10 6	159 3 0	171 2 0	6	85	130	7	113	2 of 8	2 of 8	120				
67000 „ 70200	k†	—	150	1 11 6	215 2 0	231 2 0	6 1 2	100	140	7 1 2	128	3 of 8	2 of 8	120				
70200 „ 73400	l†	—	150	1 12 6	231 2 0	249 2 0	6 1 2	100	140	7 1 2	128	3 of 8	2 of 8	120				
73400 „ 76800	m†	—	150	1 13 6	248 2 0	268 2 0	6 1 2	100	140	7 1 2	128	3 of 8	2 of 8	120				
76800 „ 80200	n†	—	150	1 13 6	248 2 0	268 2 0	6 1 2	100	140	7 1 2	128	3 of 8	3 of 8	120				
80200 „ 83800	o†	—	150	1 14 6	265 3 0	288 0 0	7	113	140	7 1 2	128	3 of 8	3 of 8	120				
83800 „ 87600	p†	—	150	1 14 6	265 3 0	288 0 0	7	113	140	7 1 2	128	3 of 8	3 of 8	120				
87600 „ 91600	q†	—	150	1 15 6	284 0 0	309 0 0	7	113	150	8	149	3 of 8	3 of 8	120				
91600 „ 95800	r†	—	150	1 15 6	284 0 0	309 0 0	7	113	150	8	149	3 of 8	3 of 8	120				
95800 „ 100200	s†	—	150	2	299 1 0	330 0 0	7 1 2	128	150	8	149	3 of 8	3 of 8	120				
100200 „ 105000	t†	—	150	2	299 1 0	330 0 0	7 1 2	128	150	8	149	3 of 8	3 of 8	120				

N.B.—For Notes to the above Table, and Equipment of Trawlers and Tugs, see back of Table and following pages.

TABLE 31.
CAM VESSELS.

(Concluded.)

and Weights of Chains, and the Proof
and Weights of Chains, and the Proof
Also Sizes and Lengths of Towlines,
in unexceptionable form and proportions.

ES, HAWSERS, &c.

L FEEL RE (i)	TOWLINE: HEMP OR STEEL WIRE (i)			HAWRSERS AND WARPS.			
	Break- ing Test.	HEMP.		STEEL WIRE.	HAWRSERS AND WARPS.		
		Length. Fathms.	Size.		Break- ing Test.	Size of each.	Size of each.
Tons.		Fathms.	Ins.	Ins.	Tons.	Ins.	Fathms.
—	75	75	5 $\frac{1}{2}$	2	7	3	—
7	75	75	6	2 $\frac{1}{4}$	9 $\frac{1}{2}$	4	—
7	75	75	6	2 $\frac{1}{4}$	9 $\frac{1}{2}$	4	—
9 $\frac{1}{2}$	75	75	6 $\frac{1}{2}$	2 $\frac{1}{4}$	9 $\frac{1}{2}$	4	—
9 $\frac{1}{2}$	75	75	7	2 $\frac{1}{2}$	12 $\frac{1}{2}$	5	—
15 $\frac{1}{2}$	75	75	7 $\frac{1}{2}$	2 $\frac{1}{2}$	12 $\frac{1}{2}$	5 $\frac{1}{2}$	—
15 $\frac{1}{2}$	75	75	7 $\frac{1}{2}$	2 $\frac{1}{2}$	12 $\frac{1}{2}$	5 $\frac{1}{2}$	—
15 $\frac{1}{2}$	75	75	8	2 $\frac{3}{4}$	15 $\frac{1}{2}$	6	—
18	75	75	8 $\frac{1}{2}$	2 $\frac{3}{4}$	15 $\frac{1}{2}$	6	—
18	75	75	8 $\frac{1}{2}$	2 $\frac{3}{4}$	15 $\frac{1}{2}$	6	—
22	90	90	9	3	18	6	5
22	90	90	9	3	18	6	5
26	90	90	9 $\frac{1}{2}$	3 $\frac{1}{4}$	22	6	5
26	90	90	10	3 $\frac{1}{4}$	22	6	5
29	90	90	10	3 $\frac{1}{4}$	22	2 of 6	2 of 5
29	90	90	10	3 $\frac{1}{4}$	22	2 of 6	2 of 5
33	90	90	11	3 $\frac{1}{2}$	26	2 of 6	2 of 5
33	90	90	11	3 $\frac{1}{2}$	26	2 of 6	2 of 5
35	90	90	12	4	33	2 of 7	2 of 6
35	100	100	12	4	33	2 of 7	2 of 6
35	100	100	12	4	33	2 of 7	2 of 6
39	120	120	12	4	33	2 of 7	2 of 7
39	120	120	13	4 $\frac{1}{2}$	39	2 of 7	2 of 7
39	120	120	13	4 $\frac{1}{2}$	39	2 of 7	2 of 7
47	120	120	14	4 $\frac{3}{4}$	47	2 of 8	2 of 7
47	120	120	14	5	59	2 of 8	2 of 7
59	120	120	15	5 $\frac{1}{4}$	65	2 of 8	2 of 7
59	130	130	15	5 $\frac{1}{2}$	71	2 of 8	2 of 8
59	130	130	15	5 $\frac{3}{4}$	78	2 of 8	2 of 8
65	130	130	16	6	85	2 of 8	2 of 8
65	130	130	16	6	85	2 of 8	2 of 8
71	130	130	16	6	85	2 of 8	2 of 8
85	130	130	17	7	113	2 of 8	2 of 8
85	130	130	—	7	113	2 of 8	2 of 8
85	130	130	—	7	113	2 of 8	2 of 8
1 $\frac{1}{4}$	35	90	12	4	—	—	—

tk.	HAWRSERS.			WARPS.	
	Length.	Size.	Length.	Size.	
3	Fathms.	Ins.	Fathms.	Ins.	
11	60	5	60	2 $\frac{1}{2}$	
11	60	5 $\frac{1}{2}$	60	3	
17	60	5 $\frac{1}{2}$	60	3	
17	60	5 $\frac{1}{2}$	60	3 $\frac{1}{2}$	
11	60	5 $\frac{1}{2}$	60	3 $\frac{1}{2}$	
13	60	5 $\frac{1}{2}$	60	4	
0	60	5 $\frac{1}{2}$	60	4	
0	60	6	60	4 $\frac{1}{2}$	
12	60	6	60	4 $\frac{1}{2}$	
12	60	6	60	5	
21	60	6	60	5	
21	60	6	60	5	
21	60	6	60	5	
12	60	7	60	5	

Testing Machine in accordance with

different trades, the weight of Anchors

one of them may be 7 $\frac{1}{2}$ per cent. lighter
collective weight of the two Anchors

one of them may be 15 per cent., and
in the Table, provided the collective
Table. Where it may be desired by
ight, provided the collective weight

best Bower Anchor be lighter than

N.B.—For Notes

100200	"	105000
95800	"	100200
91600	"	95800
87600	"	91600
83800	"	87600
80200	"	83800
76800	"	80200
73400	"	76800
70200	"	73400
67000	"	70200
63800	"	67000
61000	"	63800

RENEWAL OF CHAIN CABLES WHEN WORN.

When any length of a Chain Cable is worn so that the mean diameter at its most worn part is reduced to the size given in the following Table it is to be renewed.

Size of Chain Cable originally.	Should be renewed when worn to	Size of Chain Cable originally.	Should be renewed when worn to	Size of Chain Cable originally.	Should be renewed when worn to	Size of Chain Cable originally.	Should be renewed when worn to
Diameter in inches.	Mean diameter in inches.	Diameter in inches.	Mean diameter in inches.	Diameter in inches.	Mean diameter in inches.	Diameter in inches.	Mean diameter in inches.
$\frac{1}{16}$	$\frac{2}{3}$	$1\frac{4}{16}$	$1\frac{2}{16}$	$1\frac{1}{16}$	$1\frac{10}{16}$	$2\frac{6}{16}$	$2\frac{2}{16}$
$\frac{1}{16}$	$\frac{2}{3}$	$1\frac{5}{16}$	$1\frac{3}{16}$	$1\frac{1}{16}$	$1\frac{11}{16}$	$2\frac{7}{16}$	$2\frac{3}{16}$
$\frac{1}{16}$	$\frac{2}{3}$	$1\frac{6}{16}$	$1\frac{7}{16}$	$1\frac{1}{16}$	$1\frac{15}{16}$	$2\frac{8}{16}$	$2\frac{4}{16}$
$\frac{1}{16}$	$\frac{2}{3}$	$1\frac{7}{16}$	$1\frac{9}{16}$	2	$1\frac{2}{16}$	$2\frac{9}{16}$	$2\frac{5}{16}$
$\frac{1}{16}$	$\frac{2}{3}$	$1\frac{8}{16}$	$1\frac{11}{16}$	$2\frac{1}{16}$	$1\frac{2}{16}$	$2\frac{10}{16}$	$2\frac{1}{16}$
$\frac{1}{16}$	$\frac{2}{3}$	$1\frac{9}{16}$	$1\frac{13}{16}$	$2\frac{2}{16}$	$1\frac{3}{16}$	$2\frac{11}{16}$	$2\frac{2}{16}$
1	$\frac{2}{3}$	$1\frac{10}{16}$	$1\frac{15}{16}$	$2\frac{3}{16}$	$1\frac{3}{16}$	$2\frac{12}{16}$	$2\frac{3}{16}$
$1\frac{1}{16}$	$\frac{15}{16}$	$1\frac{11}{16}$	$1\frac{17}{16}$	$2\frac{4}{16}$	2	$2\frac{13}{16}$	$2\frac{4}{16}$
$1\frac{2}{16}$	1	$1\frac{12}{16}$	$1\frac{18}{16}$	$2\frac{5}{16}$	$2\frac{14}{16}$	$2\frac{5}{16}$	$2\frac{5}{16}$
$1\frac{3}{16}$	$1\frac{13}{16}$						$2\frac{6}{16}$

Extract from the Rules for Wood and Composite Vessels, Section 32.

Tonnage for Regulating the Scantlings and Equipment (as regards Anchors, Chains, &c.).

In flush-decked vessels having either one, two or three decks (not being spar or awning-decked), the tonnage under the upper deck, without abatement of the tonnage of the space for the crew, or for the propelling power of steam vessels, is to regulate all the scantlings of the hull, and also the equipment of the vessel, as regards anchors, chains, warps, &c.

† In vessels having a raised quarter deck, or a poop, or top-gallant forecastle, or deck houses, or awning-deck, or spar deck, the total tonnage below the tonnage deck is to regulate the scantlings of the hull, but the register tonnage, as cut on the main beam of sailing vessels and of steam vessels, with the addition of the tonnage of the space required for propelling power, is to regulate the equipment.

But in vessels where the tonnage of the erections above the tonnage deck is less than that allowed for crew space, then the difference between the tonnage of these erections and the tonnage of the space allowed for crew is to be added to the register tonnage, cut on the main beam, for the tonnage that is to regulate the equipment.

LLOYD'S REGISTER OF SHIPPING.

ANCHORS.

Anchors may only be made of forged wrought iron, or forged open hearth ingot steel, or cast steel; the use of Basic Bessemer steel is, however, prohibited. Each important part of a forged anchor must

CAST STEEL

All Cast Steel Anchors intended for vessels classed or proposed to be classed in the Society's Register Book must, in addition to undergoing the statutory tests, be subjected to the percussive, hammering, and bending tests recommended in the report of the Committee appointed by the Board of Trade to consider the question of tests of Cast Steel Anchors.

These tests, which are hereunder set forth, must be carefully and completely made in the presence and to the satisfaction of officers appointed by the Committee, viz.:—

PERCUSSIVE TEST.

1. Anchors, or when anchors are made of more than one piece, each piece shall be subject to this test, as follows:—

GIVEN WEIGHT. GIVEN HEIGHT. raised the given height for the given weight and shall be dropped on an iron slab.
15 cwt. and below - 15 feet. Above 15 cwt. - 12 feet.

The given height means that the lowest part of the anchor or piece when suspended shall be at least the given height above the iron slab to which it is to be dropped.

2. An anchor of the Admiralty pattern shall first be raised vertically to the given height with its shanks and arms in a horizontal position, and shall be let fall from that height.

3. It shall then be raised a second time to the given height, and shall be suspended with the crown downwards. Two iron blocks shall be placed underneath it, and it shall be let fall from this position so that one of the blocks receives it on the middle of one arm, and the other block receives it on the middle of the other arm.

4. The slab for the horizontal test shall be of steel or iron, well laid on a solid concrete foundation to the satisfaction of the inspector.

5. If the slab on which the anchor falls is broken, the test shall be repeated until a slab is made that does not break.

6. The blocks for the vertical test shall be solid, and shall be of sufficient height to prevent the crown of the anchor from touching the slab, and shall be otherwise to the satisfaction of the inspector.

HAMMERING TEST.

7. When the percussive test has been passed successfully, to the satisfaction of the inspector, the anchor or piece shall be slung and freely

be plainly marked by the Makers with the words 'Forged Wrought Iron,' or 'Forged Open Hearth Ingot Steel.' Anchor shackles, if of steel, must be forged and unwelded.

ANCHORS.

put to a hammering test as follows, that is to say, it shall be well hammered over its parts with a sledge hammer weighing not less than 7 lbs., and shall be required to give under this treatment such a clear ring in all its parts as shall satisfy the inspector that the casting is sound, and without flaws existing, either originally or developed as the result of the application of the preceding percussive tests.

BENDING TEST.

8. Cast steel may be passed as sufficiently ductile for anchors when a piece of each casting, 8 inches in length, is cut from the casting, turned to 1 inch in diameter, and is then bent cold by hammering through an angle of 90 degrees over a radius of $1\frac{1}{2}$ inches, without showing signs of flaw or fracture.

9. There must be a piece cast on each cast steel anchor, or on each portion of such anchor when it is made of more than one casting, and such piece must be of sufficient size to enable one test piece of the size before stated to be cut out of it, or it may be (at the discretion of the manufacturer) of sufficient size to enable four test pieces to be cut out of it. If it is only of sufficient size to enable one test piece to be cut out of it, that piece shall be subjected to the bending test named in paragraph 8, and, if it fails to withstand it, the casting is to be condemned.

If the piece is large enough to enable four test pieces to be cut out of it, these four test pieces shall be disposed of as follows, that is to say, one of them shall be turned in a lathe to 1 inch in diameter for a length of 8 inches, and bent cold through an angle of 90 degrees over a radius of $1\frac{1}{2}$ inches, and if it withstands this test without flaw or fracture, shall be deemed to have withstood a satisfactory test for ductility. If the one test piece does not pass this test, all or any of the other three test pieces may be tested in a similar manner, and if any one of the four test pieces passes this test, the anchor or part of the anchor, as the case may be, shall be deemed so far satisfactory.

ANNEALING.

10. Each anchor must be properly and sufficiently annealed, and, when so annealed, shall be stamped "annealed steel." Annealing is not to be regarded as proper, or efficient, unless the process extends from three days for small anchors, up to six days for large ones.

PROVING ESTABLISHMENTS.

The following Proving Establishments are recognised by the Committee of Lloyd's Register for the Testing of Anchors and Chains while licensed by the Board of Trade for that purpose:—

NETHERTON (near Dudley)—Lloyd's Proving House	Superintendent, Mr. H. Green.
TIPTON—Lloyd's Proving House	ditto Mr. C. E. Perrins.
LOW WALKER—Lloyd's Proving House.....	ditto Mr. A. Green.
CHESTER (Saltney)—Lloyd's Proving House	ditto Mr. H. T. Welford.
GLASGOW—Lloyd's Proving House.....	ditto Mr. E. Seedhouse.
CARDIFF—Lloyd's Proving House	ditto Mr. G. W. Penn.
SUNDERLAND—Lloyd's Proving House	ditto Mr. L. Haffner.
CRADLEY HEATH—Lloyd's Proving House	ditto Mr. S. C. Paul.

N.B.—Vessels supplied with Anchors and Chain Cables tested at any of the Proving Establishments in the above list, will have the notation of "Lloyd's A.&C.P." in the Register Book, signifying that the Anchors and Chain Cables have been tested at a machine under the control of the Committee of Lloyd's Register of Shipping.

The following Machines have been recognised by the Committee for the testing of Anchors and Chain Cables supplied to foreign owned vessels (*see Section 50 of the Rules*):—

DENMARK	Government Establishment at Copenhagen.
FRANCE	Chantiers de la Loire, Nantes.
"	V ^e . E. Couillard, Succ ^r , Havre.
"	Marrel Frères, Capelette, Marseilles.
"	M. Hemet, Havre.
HOLLAND	Ketting en Ankerfabriek " Holland," Schiedam.
"	Koninklijke Nederlandsche Grofsmederij, Leiden.
JAPAN	Mitsubishi Dockyard and Engine Works, Nagasaki.
"	Nippon Chain Works, Ltd., Osaka.
SWEDEN	Government Establishment at Kongl. Tekniska Högskolan, Stockholm.
"	Ljusne Chain Works (Ljusne Kätting-fabrik), Ljusne, Sweden.
UNITED STATES...	American Steel Casting Co., Chester, Pa. (for the testing of Anchors only).
" , "	Baldt Anchor Co., Chester, Pa. (for the testing of Anchors only).
" , "	Baldt Steel Co., New Castle, Delaware (for the testing of Anchors only).
" , "	Bradlee & Co.'s Works, Philadelphia, Pa.
" , "	Cape Ann Anchor Works, Gloucester, Mass.
" , "	J. B. Carr Co., Troy, N.Y.
" , "	Columbus Chain Co., Columbus, Ohio.

UNITED STATES...	Frankford Chain Works, Frankford, Philadelphia, Pa. <i>(Continued).</i>
" , "	Hayden-Corbett & Co., Columbus, Ohio.
" , "	Herreshoff Manufacturing Co., Bristol, R.I. (for the testing of Anchors only).
" , "	Jones & Laughlin Steel Co., Pittsburg, Pa.
" , "	Lebanon Chain Works, Lebanon, Pa.
" , "	The Logan Iron and Steel Co., Burnham, Pa.
" , "	J. McKay & Co.'s Iron City Chain Works, McKees Rocks, near Pittsburg, Pa.
" , "	Monongahela Iron and Steel Co., Pittsburg, Pa.
" , "	The Seaboard Steel Castings Co., Chester, Pa. (for the testing of Anchors only).
" , "	Seneca Chain Co., Kent, Ohio.
" , "	The Standard Chain Co., Columbus, Ohio; and Braddock, near Pittsburg, Pa.
" , "	Weimer Chain & Iron Co., Lebanon, Pa.
" , "	West End Rolling Mills, Lebanon, Pa.
" , "	Whitehill Chain Works, Whitehill, Fieldsboro, N.J.
" , "	Woodhouse Chain Works, Trenton, N.J.

By order of the Committee,

ANDREW SCOTT,

Secretary.

WOOD WOOD

unpublished off of Googlebooks off of [www.archive.org](http://www.archive.org/details/woodwood) and www.gutenberg.org

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PROVING ESTABLISHMENTS.

AM VE

and Weights are recognised by the Committee of Lloyd's Register for the Testing of Anchors
 Also Sizes while licensed by the Board of Trade for that purpose:—
 unexceptional

S, HAWKS

d's Proving House Superintendent, Mr. H. Green.

TOWNS TEST.	Length. Fathoms.			
SEL E (i)				
Breaking Test.				
Tons.				
—				
7	75			
7	75			
7	75			
9½	75			
9½	75			
15½	75			
15½	75			
15½	75			
18	75			
18	75			
22	90			
22	90			
		recognised by the Committee for the testing of Anchors and Chain Cables supplied to		
		reign owned vessels (<i>see Section 50 of the Rules</i>):—		
26	90			
26	90			
29	90			
29	90			
33	90			
33	90			
35	90			
35	100			
35	100			
39	120			
39	120			
39	120			
47	120			
47	120			
59	120			
59	130			
65	130			
65	130			
71	130			
85	130			
85	130			
35	90			

ing House ditto Mr. C. E. Perrins.

House ditto Mr. A. Green.

ing House ditto Mr. H. T. Welford.

e ditto Mr. E. Seedhouse.

75 ditto Mr. G. W. Penn.

House ditto Mr. L. Haffner.

ng House ditto Mr. S. C. Paul.

chors and Chain Cables tested at any of the Proving Establishments in the above list, will
 ." in the Register Book, signifying that the Anchors and Chain Cables have been tested
 Committee of Lloyd's Register of Shipping.

UNITED STATES... Frankford Chain Works, Frankford, Philadelphie, Pa.
(Continued).

- " " ... Hayden-Corbett & Co., Columbus, Ohio.
- " " ... Herreshoff Manufacturing Co., Bristol, R.I.
 (for the testing of Anchors only).
- " " ... Jones & Laughlin Steel Co., Pittsburg, Pa.
- " " ... Lebanon Chain Works, Lebanon, Pa.
- " " ... The Logan Iron and Steel Co., Burnham, Pa.
- " " ... J. McKay & Co.'s Iron City Chain Works,
 McKees Rocks, near Pittsburg, Pa.
- " " ... Monongahela Iron and Steel Co., Pittsburg,
 Pa.
- " " ... The Seaboard Steel Castings Co., Chester,
 Pa. (for the testing of Anchors only).
- " " ... Seneca Chain Co., Kent, Ohio.
- " " ... The Standard Chain Co., Columbus, Ohio;
 and Braddock, near Pittsburg, Pa.
- " " ... Weimer Chain & Iron Co., Lebanon, Pa.
- " " ... West End Rolling Mills, Lebanon, Pa.

WOOD VESSEL

bottom end of compassed or round bottomed vessel
bottom vessel.

WOOD VESSELS.

Exhibiting the Number of Years to be assigned to the different quality, properly seasoned,

	DESCRIPTION OF TIMBER.	TIMBERING.				
		Floors.	First Foothooks.	Second Foothooks.	Third Foothooks and Top Timbers.	Main and Rider Keelsons.
1	East-India Teak	16	16	16	16	16
2	English, African, and Live Oak, Adriatic, Italian, Spanish, Portuguese, and French Oak; Morung Saul, Greenheart, Morra, Iron Bark, and White Iron Bark	12	12	12	12	12
3	Cuba Sabicu, Pencil Cedar, Angelly, Vanatica, Jarrah Timber, Karri, Blue Gum, Red Gum, Box, Thingam, Puhutukawa, Molave, Dungon, Yacal, Mangachapuy, Betis, Ipil, Guijo, Narra, Batitinan, and Palomaria de Playa	10	10	10	10	10
4	Second-hand English, African, and Live Oak, Adriatic, Italian, Spanish, Portuguese, and French Oak; East-India Teak, Morung Saul, Greenheart, Morra, and Iron Bark (e)	8	8	7	7	7
5	Stringy Bark, and Red Cedar, Banaba and Philippine Islands Cedar	8	8	7	7	8
6	Danish Oak, other Continental White Oak, Mahogany of <i>Hard Texture</i> , Spanish Chestnut, Flooded Gum, Spotted Gum, Grey Gum, Turpentine, Black Butt, Tulip-wood, Tallow-wood, and Mulberry	*9	*9	9	9	*9
7	North American White Oak	*8	8	8	8	8
8	Pitch Pine, Oregon Pine, Huon Pine, Cowdie or Kaurie Pine, Larch, Hackmatack, Tamarac, and Juniper	*9	*9	9	9	*9
9	Dantzie, Memel, Riga, and American Red Pine	*8	*8	8	8	*8
10	English Ash	*8	*6	*5	*5	*5
11	Foreign Ash and Rock Maple	*8	—	—	—	—
12	American Rock Elm and Hickory	*7 (f)	*6	6	6	*7
13	European and American Grey Elm	*6	*6	6	6	6
14	Black Birch and Black Walnut	*7 (f)	*6 (f)	—	—	—
15	Spruce Fir, Swedish and Norway Red Pine, and Scotch Fir ..	*8	*8	8	8	8
16	Beech	*7 (f)	*6	—	—	—
17	Yellow Pine	—	—	—	*4	*4

(a) This Table applies as to the Deadwood so far as regards the Materials to be used from the height of two feet above the rabbet of the Keel.

(b) American Rock Elm allowed for Limber Strakes, Bilge Strakes, and Ceiling between them in Ships of the 9 years' grade, and under.

(c) Yellow Pine allowed for Waterways of Upper Deck in Ships of the 8 years' grade, and under, if properly fastened as prescribed in Table B, and provided the Beams are well secured independently of the Waterways.

(d) The Materials marked thus *d* under the head of "Rudder and Windlass," allowed in Ships of 300 Tons and under only.

(e) In cases where second-hand Timber of the description named in line No. 4 is proposed to be used, application may be made to the Committee, who will appoint a special survey to be held thereon; and on a Report being received of its being of superior quality and of adequate size, a higher grade (not exceeding two years) may be allowed than as above set forth.

(f) Black Birch, Beech, and American Rock Elm allowed for Floors amidships to an extent not exceeding three-fifths the entire length of the Keel in Ships of the 9 years' grade and under.

Black Birch allowed for First Futtocks amidships to the same extent in Ships of the 8 years' grade.

TABLE A.

descriptions of Timber used in Ships, the same to be of good and free from defects.

TIMBERING.			Pall Bitt, Windlass, and Main Piece of Rudder.	OUTSIDE PLANK, &c.				INSIDE PLANK, &c.
Transoms, Knightheads, Hawse- Timbers, Apron, and Deadw'd (a) Stem and Stern Post.	Beams and Hooks.	Knees.		From top of Keel to two-fifths the depth of Hold	From two-fifths the depth of Hold to Wales.	Wales, Black- Strakes, Topsides, and Sheerstrakes.	Upper deck Waterway, Spirketting, and Plankshears.	Shelves, Clamps, Limber and Bilge Strakes, Ceiling in hold and betwixt Decks, also Spirketting and Waterway below the Upper Deck.
16	16	16	16	16	16	16	16	16
12	12	12	12	12	12	12	12	12
10	12	12	10	12	10	10	10	12
7	7	7	7	—	—	—	7	7
7	7	7	8	12	8	7	7	8
9	*9	*9	*9	*12	10	10	10	*10
8	8	*7	*9	*12	*8	8	8	8
9	*9	*9	*9 (d)	*12	10	10	*10	10
8	*8	*8	*6 (d)	*9	9	9	*10	9
*4	*5	*5	*5 (d)	*10	5	—	—	—
—	—	—	—	*8	6	—	—	*5
6	*7	6	*7	*12	7	6	6	7 (b)
6	6	6	—	*12	6	—	—	—
—	—	—	*6 (d)	*10	6	6	—	—
8	8	*8	—	*8	8	8	8	8
—	—	—	*6 (d)	*12	6	—	—	—
*4	*4	*4	—	*6	*5	*5	*5 (e)	*5

MEM.—The word "English" includes Timber the growth of the United Kingdom.

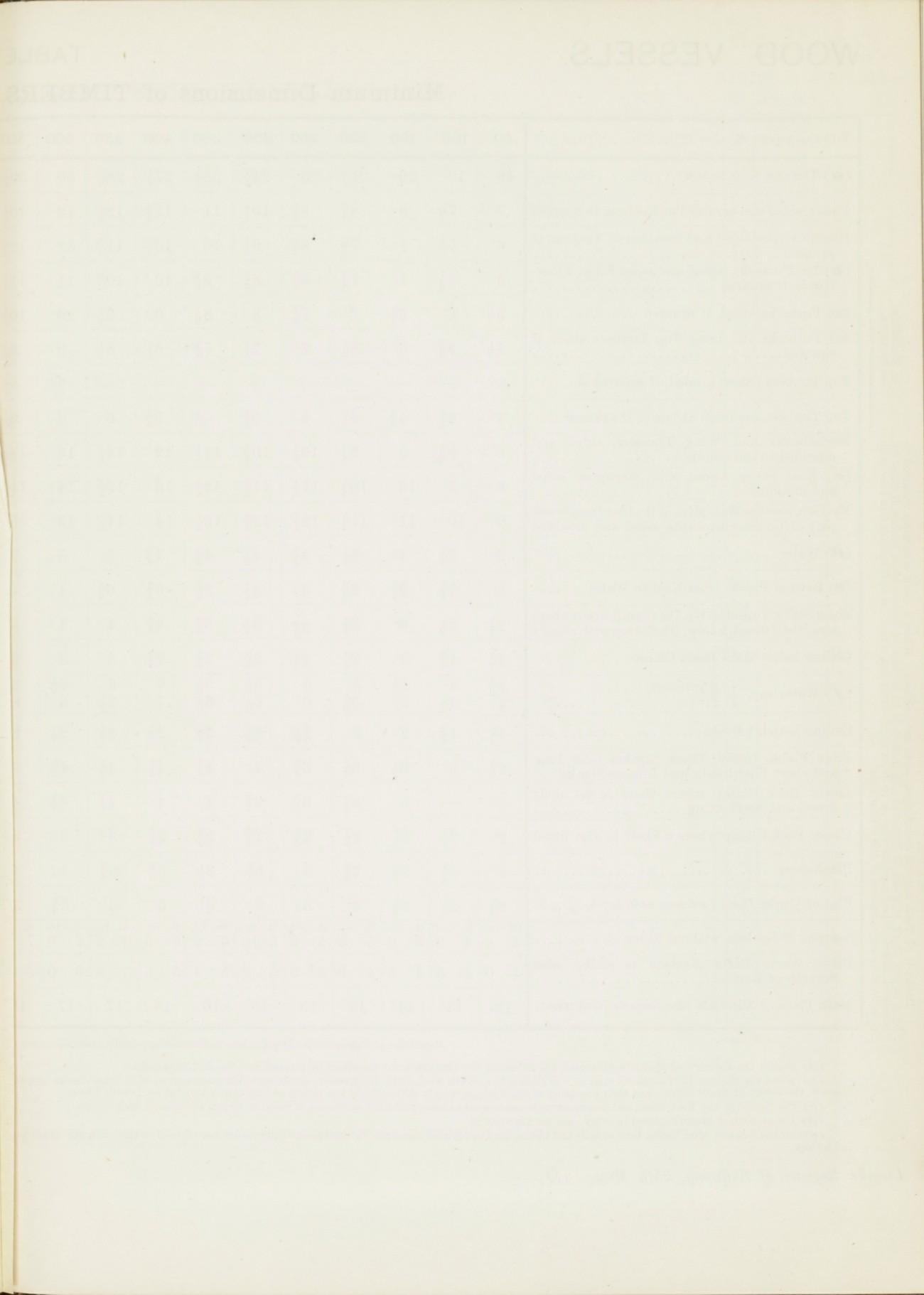
SALTING. All Ships built of the Timber above named, except those built wholly of Teak, will have one year added to their classification, if salted, provided it be done to the satisfaction of the Surveyors and as prescribed in Section 37 of the Rules; but Vessels built of the Materials contained in Lines 6 to 17 inclusive must be salted, or one year will be deducted from the term of years assigned on the Table, except where used for those parts indicated by an asterisk, thus: *

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WOOD VESSELS.

TABLE

Minimum Dimensions of TIMBERS,

TONNAGE (See Section 32)	TONS....	50	100	150	200	250	300	350	400	450	500	550
(a) TIMBER AND SPACE.....	INCHES..	18	19	20	21 $\frac{1}{2}$	23	24 $\frac{1}{4}$	25 $\frac{3}{4}$	27 $\frac{1}{4}$	28 $\frac{1}{2}$	30	30 $\frac{1}{4}$
Floors, sided and moulded at Keelson, if squared		7	7 $\frac{1}{2}$	8	8 $\frac{3}{4}$	9 $\frac{1}{2}$	10 $\frac{1}{4}$	11	11 $\frac{3}{4}$	12 $\frac{1}{4}$	13	13 $\frac{1}{4}$
Double Floors, sided and moulded at Keelson, if squared.....		6	6 $\frac{1}{2}$	7	7 $\frac{3}{4}$	8 $\frac{1}{2}$	9 $\frac{1}{4}$	10	10 $\frac{1}{2}$	11 $\frac{1}{4}$	12	12 $\frac{1}{4}$
(b) 1st Futtocks, sided and moulded at Floor-Heads, if squared		6	6 $\frac{1}{2}$	7	7 $\frac{3}{4}$	8 $\frac{1}{4}$	8 $\frac{3}{4}$	9 $\frac{1}{4}$	10	10 $\frac{1}{2}$	11	11 $\frac{1}{4}$
2nd Futtocks, sided, if squared		5 $\frac{1}{2}$	6	6 $\frac{1}{2}$	7	7 $\frac{1}{2}$	8	8 $\frac{1}{2}$	9	9 $\frac{1}{2}$	10	10 $\frac{1}{4}$
3rd Futtocks and Long Top Timbers, sided, if squared.....		5 $\frac{1}{2}$	5 $\frac{3}{4}$	6	6 $\frac{1}{2}$	7	7 $\frac{1}{4}$	7 $\frac{3}{4}$	8 $\frac{1}{4}$	8 $\frac{1}{2}$	9	9 $\frac{1}{4}$
Top Timbers (Short), sided, if squared		—	—	—	—	—	—	—	—	—	9	9 $\frac{1}{4}$
Top Timbers, moulded at heads, if squared		4	4 $\frac{1}{2}$	4 $\frac{3}{4}$	5	5	5 $\frac{1}{4}$	5 $\frac{1}{2}$	5 $\frac{3}{4}$	6	6	6 $\frac{1}{4}$
Breasthooks and Wing Transom, sided and moulded in the middle		8	8 $\frac{1}{2}$	9	9 $\frac{3}{4}$	10 $\frac{1}{4}$	10 $\frac{3}{4}$	11 $\frac{1}{4}$	12	12 $\frac{1}{2}$	13	13 $\frac{1}{4}$
(c) Keel, Stem, Apron, and Sternpost, sided and moulded		8	9	10	10 $\frac{3}{4}$	11 $\frac{1}{4}$	11 $\frac{3}{4}$	12 $\frac{1}{4}$	13	13 $\frac{1}{2}$	14	14 $\frac{1}{4}$
Keelson, also the Mainpiece of Rudder from lower part of Counter upwards, sided and moulded		9	10	11	11 $\frac{3}{4}$	12 $\frac{1}{4}$	12 $\frac{3}{4}$	13 $\frac{1}{4}$	14	14 $\frac{1}{2}$	15	15 $\frac{1}{4}$
(d) Wales		3	3 $\frac{1}{2}$	4	4 $\frac{1}{4}$	4 $\frac{1}{4}$	4 $\frac{1}{2}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	5	5	5
(e) Bottom Plank, from Keel to Wales		2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4	4
Sheer Strks, Topsides, Up. Dk. Clamp where there is no Shelf fitted, & Low. Dk. Clamp with a Shelf		2 $\frac{1}{4}$	2 $\frac{1}{2}$	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4	4	4
Ceiling below Hold Beam Clamp		1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	3	3	3
(f) Waterway, { Hardwood.....		3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	5	5 $\frac{1}{2}$	5 $\frac{1}{2}$	6	6	6 $\frac{1}{2}$	6 $\frac{1}{2}$
Fir		4	4 $\frac{1}{2}$	5	5 $\frac{1}{2}$	6	6 $\frac{1}{2}$	6 $\frac{1}{2}$	7	7 $\frac{1}{2}$	8	8
Ceiling betwixt Decks		1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
Bilge Plank, inside, Thick Strakes over long and short Floorheads, and Limber Strake ..		2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4	4 $\frac{1}{4}$	4 $\frac{1}{4}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$
Lower Deck Clamp where there is no shelf fitted, and Spirketting		—	—	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{3}{4}$	4	4	4 $\frac{1}{4}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$
Upper Deck Clamp where a Shelf is also fitted		2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	3	3	3
Planksheer		2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4	4
Flat of Upper Deck (see note at side)		2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3	3	3	3	3	3	3 $\frac{1}{2}$	3 $\frac{1}{2}$
Scarphs of Keelson without Rider		ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
Ditto, where Rider Keelson is added, also Scarphs of Keel		4	6	4	9	5	0	5	3	5	6	6
Main Piece of Windlass (see footnote) INCHES..		12	14	14	15	15	15	16	16	16	17	17

Mouldings of Futtocks and Top Timbers to diminish gradually from size given at

(a) Should the timber and space be increased, the siding of the timbers to be increased in proportion. See RULES, sec. 39.

(b) When the heels of 1st Foothooks meet at the middle line on the Keel, under the Keelson, either with full moulding, or with Cross Chocks properly butted, the siding of single Floors, and their moulding at the Keelson, may be REDUCED to the siding and moulding allowed for Double Floors.

(c) The rabbet of the Keel, Stem, and Sternpost to be made so as to leave sufficient substance of wood to form a substantial back rabbet.

(d) For breadth of Wales required in every case, see SECTION 45.

(e) All the fore and after hoods, both outside and inside, may be reduced one-sixth in thickness. Furrens are not allowed in this or in any other part of a ship.

For Moulding,
see footnote.

Decks if of Teak may be reduced one-sixth in thickness. When a deck originally required to be 4 inches thick is worn to 3 inches; 3 $\frac{1}{2}$ inches to 2 $\frac{1}{4}$ inches; 3 $\frac{1}{4}$ inches to 2 $\frac{1}{2}$ inches, it must be renewed, unless it be found on survey in good condition, when, on application, the case will receive the consideration of the Committee.

Lloyd's Register of Shipping, 25th May, 1871.

B.
KEELSON, KEEL, PLANKING, &c.

TABLE C.
SIDING & MOULDING
OF BEAMS.—Sec. 41.

600	650	700	750	800	850	900	950	1050	1150	1250	1350	1500	1750	2000	
30½	31	31½	31½	31¾	32¼	32½	32¾	33¼	33½	33½	33¾	34	34½	35	
13½	13½	13½	13¾	13¾	14	14	14½	14½	14¾	15	15½	15½	15½	15¾	
12½	12½	12½	12¾	12¾	13	13	13½	13½	13¾	14	14½	14½	14½	14¾	
11½	11¾	11¾	12	12½	12½	12½	12¾	13¼	13½	13¾	14½	14½	14½	14¾	
10½	10¾	10¾	11	11½	11½	11½	11¾	12½	12½	12¾	13½	13½	13½	13¾	
9½	9¾	9¾	10	10½	10½	10½	10¾	11½	11½	11¾	12½	12½	12½	12¾	
9½	9½	9½	9½	9½	9¾	9¾	10	10	10½	10½	10¾	10¾	11	11½	
6½	6½	6½	6¾	6¾	7	7	7½	7½	7½	7¾	8½	8½	8¾	9	
13½	13½	13½	13¾	13¾	14	14	14½	14½	14¾	15	15½	15½	15½	16	
14½	14½	14½	14¾	14¾	15	15	15½	15½	15¾	16	16½	16½	16¾	17	
15½	15½	15½	15¾	15¾	16	16	16½	16½	16¾	17	17½	17½	17¾	18	
5	5½	5½	5½	5½	5½	5½	5¾	6	6	6	6½	6½	6¾	7	
4	4	4	4	4½	4½	4½	4½	4½	4½	4½	4½	4½	4¾	5	
4	4	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	4½	
3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	4	4	4½	4½	4½	
6½	7	7	7	7½	7½	7½	7½	7½	7½	8	8	8½	8½	9	
8	8½	8½	8½	8½	9	9	9	9	9	9½	9½	9½	9½	10	
2½	2½	2½	2½	2½	2½	2½	2½	2½	3	3	3	3½	3½	3½	
4½	4½	4½	4¾	4¾	5	5	5½	5½	5¾	6	6½	6½	6½	7	
4¾	4¾	4¾	4¾	4¾	5	5	5	5½	5½	5½	5½	5½	5½	6	
3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	4	4	4½	4½	5	
4	4	4	4	4	4	4	4	4	4	4	4	4½	4½	5	
3½	3½	3½	3½	3½	4	4	4	4	4	4	4	4	4	4	
ft. in.															
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6 0	6 0	6 0	6 3	6 3	6 3	6 3	6 3	6 6	6 6	6 9	6 9	7 0	7 0	7 0	
18	19	19	20	21	21	22	22	23	23	24	24	25	25	27	

Floor Heads to that at Top Timber Heads. See RULES, sec. 38.

(f) This depth of Waterway for Faying Surface against Timbers is required, below the underside of the Planksheer, to receive in and out through Bolts at alternate Timbers, with alternate through bolts in Shelf, and in Clamp where there is no Shelf.

MEM.—For relaxations in respect to Poops, Top-gallant Forecastles, and raised quarter decks, see RULES, sec. 38. For requirements for Vessels of excessive lengths as compared with breadth and depth, see RULES, secs. 39, 45, and 62.

WINDLASS.—The diameter of main piece of windlasses in Steam Ships may be 7/8 of that required in the Table, provided always the body of the windlass be not of unusual length.

N.B.—The size of Orlop Beams to be the mean of the sizes here prescribed.

The siding and moulding of ALL the Beams to be the same as those amidships, except those at the AFTER END of the Ship, which may be reduced in proportion to their diminished length.

MEM.—When SPRUCE, WHITE CEDAR or YELLOW PINE is used for Beams, the dimensions are to be increased.—See RULES, sec. 40.

(SEE OTHER SIDE.)

SUGGESTED TABLE, B 2.

FOR THE THICKNESS OF INSIDE PLANK, &c., IN THE CONSTRUCTION OF SHIPS BUILT IN THE BRITISH NORTH AMERICAN
COLONIES AND ALL FIR SHIPS WHEREVER BUILT.

TONNAGE - Tons	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1050	1150	1250	1350	1500	1750	2000
Thick Waterway Inches }	5	5 $\frac{1}{4}$	5 $\frac{1}{2}$	6	6	6 $\frac{1}{2}$	7	7 $\frac{1}{2}$	7 $\frac{1}{2}$	8	8	8 $\frac{1}{2}$	8 $\frac{1}{2}$	9	9	9 $\frac{1}{2}$	9 $\frac{1}{2}$	10	10 $\frac{1}{2}$	11	11 $\frac{1}{2}$	12	12 $\frac{1}{2}$	13	13 $\frac{1}{2}$	14
Spirketting	—	—	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{3}{4}$	4	4	4 $\frac{1}{4}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	5	5	5 $\frac{1}{4}$	5 $\frac{1}{2}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	6	6 $\frac{1}{4}$	6 $\frac{1}{2}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	7
Ceiling Below Hold Beam Clamp and between Decks. . . . }	2	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4	4	4 $\frac{1}{4}$	4 $\frac{1}{4}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{3}{4}$	5	5	5 $\frac{1}{4}$	5 $\frac{1}{2}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	6	6
Bilge Plank (Inside) . .	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	3 $\frac{3}{4}$	4	4 $\frac{1}{4}$	4 $\frac{1}{2}$	4 $\frac{3}{4}$	5	5 $\frac{1}{2}$	6	6 $\frac{1}{2}$	7	7	7 $\frac{1}{2}$	8	8 $\frac{1}{2}$	9	9 $\frac{1}{2}$	10 $\frac{1}{2}$	11 $\frac{1}{2}$	12	12 $\frac{1}{2}$	13	13 $\frac{1}{2}$	14
Thickstuff over long and short Floor heads and Limber Strakes }	2 $\frac{1}{2}$	2 $\frac{3}{4}$	3	3 $\frac{1}{4}$	3 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{3}{4}$	4	4 $\frac{1}{4}$	4 $\frac{1}{2}$	4 $\frac{3}{4}$	5	5 $\frac{1}{4}$	5 $\frac{1}{2}$	5 $\frac{3}{4}$	6	6 $\frac{1}{4}$	6 $\frac{1}{2}$	6 $\frac{3}{4}$	7	7 $\frac{1}{4}$	7 $\frac{1}{2}$	7 $\frac{3}{4}$	8	8 $\frac{1}{4}$	8 $\frac{1}{2}$
Main Keelson (Rider Keelsons may be two-thirds that of main ditto.)	9	10	11	11 $\frac{3}{4}$	12 $\frac{1}{4}$	12 $\frac{3}{4}$	13 $\frac{3}{4}$	14	14 $\frac{1}{2}$	15	15 $\frac{1}{4}$	15 $\frac{1}{2}$	15 $\frac{1}{2}$	15 $\frac{1}{2}$	15 $\frac{3}{4}$	15 $\frac{3}{4}$	16	16	16 $\frac{1}{4}$	16 $\frac{1}{2}$	16 $\frac{3}{4}$	17	17 $\frac{1}{4}$	17 $\frac{1}{2}$	17 $\frac{3}{4}$	18

2. *White Lion Court, Cornhill.*

25th May, 1871.

WOOD VESSELS.

TABLE D.

Sizes of BOLTS, PINTLES OF RUDDER,

TONNAGE (see Section 32)	50	100
Heel-Knee, Stemson, and Deadwood Bolts .....Inches	$\frac{1}{16}$	$\frac{1}{16}$
Bolts in Sister Keelsons, Scarphs of Keel (a), Arms of Breast Hooks, Pointers, Crutches, Riders, Hanging and Lodging Knees to Hold or Lower Deck Beams (except in and out Throat Bolts of Hanging Knees, which must be larger), also in and out Bolts of Shelf, Clamp, and Waterway of Hold or Lower Deck Beams, and the in and out Throat Bolts of Upper Deck Hanging Knees. }	$\frac{1}{16}$	$\frac{1}{16}$
Keelson Bolts (one through Keel at each Floor), Throats of Transoms, Throats of Breasthooks, and Throats of Hanging Knees to Hold or Lower Deck Beams	$\frac{1}{16}$	$\frac{1}{16}$
Bilge, Limber Strake, and Through Butt Bolts	$\frac{9}{16}$	$\frac{1}{16}$
Other Butt Bolts	$\frac{9}{16}$	$\frac{1}{16}$
Bolts through heels of cant timbers at fore and after Deadwood. In and out bolts of Upper Deck Waterway, Shelf and Clamp, also Arms of Hanging and Lodging Knees, except in and out Throat Bolts of Hanging Knees, which must be larger.....	$\frac{1}{16}$	$\frac{1}{16}$
Pintles of Rudder { The Lower Brace must extend so as to receive not less than Two Bolts on the Planking on each side.....	$1\frac{7}{8}$	2
Hardwood Treenails.....	1	1

(a) NUMBER OF BOLTS IN SCARPHS OF KEEL:—

In Ships of 150 Tons and under 6 Bolts These Bolts to be of
Lloyd's Register of Shipping, " above 150 Tons and under 500 Tons .. 7 do. } Copper or Yellow Metal
 25th May, 1871. " 500 Tons and above..... 8 do. } in all cases.

TABLE E.

AND TREENAILS. *Section 46.*

NUMBER OF HANGING
KNEES.
Section 41.

150	200	250	300	350	400	450	500	700	900	1350
1	1	$1\frac{1}{6}$	$1\frac{2}{6}$	$1\frac{2}{6}$	$1\frac{3}{6}$	$1\frac{4}{6}$	$1\frac{4}{6}$	$1\frac{5}{6}$	$1\frac{6}{6}$	$1\frac{8}{6}$
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	1	$1\frac{2}{6}$	$1\frac{3}{6}$	$1\frac{4}{6}$
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	1	1	$1\frac{1}{6}$	$1\frac{2}{6}$	$1\frac{2}{6}$	$1\frac{3}{6}$	$1\frac{4}{6}$	$1\frac{6}{6}$
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	1
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
2	$2\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{1}{2}$	$2\frac{5}{8}$	$2\frac{3}{4}$	3	3	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{1}{2}$
1	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$

Tons.	To Hold Beams.	To Upper Deck Beams.
150	—	4
200	4	6
250	5	7
300	6	8
350	7	9
400	8	10
450	8	11
500	9	12
550	9	13
600	10	14
650	10	15
700	11	16
750	11	17
800	12	18
900	13	20
1000	14	22
1100	15	24
1350	17	26

N.B.—Bolts to be through and clenched, as prescribed in *Section 46*, and to be of good quality, well made with suitable heads and be tightly driven.

WOOD VESSELS.

Minimum Dimensions of IRON KNEE AND KNEE RIDERS FOR

TONNAGE (see Section 32)	Tons	150	200	250	300	350	400	450	500	550	600	650
Number of Hanging Knees to Hold or Lower Deck Beams	Pairs	3 (a)	4	6	8	9	Upwards,	one Knee Rider to	every			
Number of Hanging Knees to Upper and Middle Deck Beams	Pairs	4	6	7	8	9	10	11	12	13	14	15
Breadth of Knees and Riders to Hold or Lower Deck Beams	Inches	3	3	3	3	3	3	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{3}{4}$
Breadth of Upper Deck Knees, where there are two Decks, and of Middle Deck Knees, where there are three Decks	Inches	3	3	3	3	3	3	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$
Thickness of Riders at the joints or butts of the Timbers	Inches	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{3}{4}$	2	2	$2\frac{1}{4}$
Thickness of Knees to Lower Deck or Hold Beams and Knee Riders at the Angle of the Throat	Inches	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{4}$	3	3	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{3}{4}$
Thickness of Knees to Lower Deck or Hold Beams and Knee Riders at the Throat Bolts	Inches	$1\frac{3}{4}$	$1\frac{3}{4}$	2	2	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$
Thickness of Knees to Upper or Middle Deck at the Throat Bolts	Inches (b)	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{3}{4}$	2	2	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$
Thickness of Hanging Knees (not Riders) at the ends	Inches	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	1
Length of Beam Arms of Knees and Knee Riders for Lower Deck or Hold Beams...	(c)	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.						
		2 6	2 6	2 9	2 9	3 0	3 0	3 3	3 3	3 3	3 6	3 6

NOTE.—The Bolts in all Iron Riders in Hold, to be not more than twenty-one inches apart on the average. Standards upon the Beams of such Ships are not admitted as substitutes for Hanging Knees below them. For sizes of Bolts, see Table D.

(a) Provided the depth of hold be 13ft. or upwards

TABLE F.

BRITISH NORTH AMERICAN BUILT SHIPS AND FIR SHIPS. Section 62.

700	750	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
Beam, or Kne es and Riders					as per Section 62.									
16	17	18			Upwards, one to every Beam									
$3\frac{3}{4}$	4	4	$4\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{3}{4}$	$4\frac{3}{4}$	5	5	$5\frac{1}{4}$	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{1}{2}$
$3\frac{1}{2}$	$3\frac{3}{4}$	$3\frac{3}{4}$	4	4	$4\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{3}{4}$	$4\frac{3}{4}$	$4\frac{3}{4}$	$4\frac{3}{4}$
$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{4}$	3	3	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{3}{4}$	$3\frac{3}{4}$
$3\frac{3}{4}$	4	4	$4\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{3}{4}$	$4\frac{3}{4}$	5	5	$5\frac{1}{4}$	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{1}{2}$
$2\frac{3}{4}$	3	3	3	3	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{3}{4}$	$3\frac{3}{4}$
$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	3	3	3	3	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{1}{2}$
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ft. 3 6	ft. 3 9	ft. 3 9	ft. 3 9	ft. 3 9	ft. 4 0	ft. 4 0	ft. 4 0	ft. 4 0	ft. 4 0	ft. 4 0	ft. 4 0	ft. 4 0	ft. 4 0	ft. 4 0

(D) Breadth and thickness of Knees for Upper Deck, where there are Three Decks, may be one sixth less.

(E) Beam Arms of Upper and Middle Deck Knees, may be three inches shorter than those of the Lower Deck.

Side Arms of Hanging Knees not to be less in length, than one and a half the length of their Beam Arms. "Jumped Knees" will not be allowed.

Beam Arms of Knees and Knee Riders, which are 3ft. 6in. in length, to have not less than Four Bolts; and shorter than that length, to have not less than Three Bolts.

Side Arms of all Hanging Knees to have at least One Bolt more than in the Beam Arms.

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MASTS and BOWSPRITS of SAILING VESSELS
and FULL-RIGGED STEAM VESSELS.

TABLE 9.

IRON AND STEEL MASTS.

EXTREME LENGTH. (See Footnote.)	PARTNERS.		HEEL.		HOUNDS.		HEAD.		Sizes of Angle Bars in Masts.				CHEEKS.						
	Diam.	Thickness.		Diam.	Thickness.		Diam.	Thickness.		Diam.	Thickness.		Iron.	Steel.	Th'kn'ss of Plate	Sizes of Angle Bar.			
		Iron.	Steel.		Iron.	Steel.		Iron.	Steel.		Iron.	Steel.				Irn.	Stl.	Iron.	Steel.
Ft.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
48	16	$\frac{5}{16}$	$\frac{6}{20}$	13	$\frac{4}{16}$	$\frac{5}{20}$	13 $\frac{1}{2}$	$\frac{4}{16}$	$\frac{5}{20}$	11	$\frac{3}{16}$	$\frac{3}{16}$	...	...	...	$\frac{7}{16}$	$\frac{8}{20}$	$3\frac{1}{2} \times 2\frac{1}{2} \times \frac{6}{16}$	$3\frac{1}{2} \times 2\frac{1}{2} \times \frac{7}{20}$
51	17	$\frac{5}{16}$	$\frac{6}{20}$	13 $\frac{1}{2}$	$\frac{4}{16}$	$\frac{5}{20}$	14	$\frac{4}{16}$	$\frac{5}{20}$	11 $\frac{1}{2}$	$\frac{4}{16}$	$\frac{5}{20}$	...	...	...	$\frac{7}{16}$	$\frac{8}{20}$	$3\frac{1}{2} \times 3 \times \frac{6}{16}$	$3\frac{1}{2} \times 3 \times \frac{7}{20}$
54	18	$\frac{5}{16}$	$\frac{6}{20}$	14	$\frac{4}{16}$	$\frac{5}{20}$	15	$\frac{4}{16}$	$\frac{5}{20}$	12	$\frac{4}{16}$	$\frac{5}{20}$	...	...	...	$\frac{7}{16}$	$\frac{8}{20}$	$3\frac{1}{2} \times 3 \times \frac{6}{16}$	$3\frac{1}{2} \times 3 \times \frac{7}{20}$
57	19	$\frac{6}{16}$	$\frac{7}{20}$	15	$\frac{5}{16}$	$\frac{6}{20}$	15 $\frac{1}{2}$	$\frac{5}{16}$	$\frac{6}{20}$	12 $\frac{1}{2}$	$\frac{4}{16}$	$\frac{5}{20}$	...	...	...	$\frac{8}{16}$	$\frac{9}{20}$	$4 \times 3 \times \frac{7}{16}$	$4 \times 3 \times \frac{8}{20}$
60	20	$\frac{6}{16}$	$\frac{7}{20}$	16	$\frac{5}{16}$	$\frac{6}{20}$	16 $\frac{1}{2}$	$\frac{5}{16}$	$\frac{6}{20}$	13 $\frac{1}{2}$	$\frac{5}{16}$	$\frac{6}{20}$	...	...	...	$\frac{8}{16}$	$\frac{9}{20}$	$4 \times 3 \times \frac{7}{16}$	$4 \times 3 \times \frac{8}{20}$
63	21	$\frac{6}{16}$	$\frac{7}{20}$	16 $\frac{1}{2}$	$\frac{5}{16}$	$\frac{6}{20}$	17 $\frac{1}{2}$	$\frac{5}{16}$	$\frac{6}{20}$	14	$\frac{5}{16}$	$\frac{6}{20}$	...	...	...	$\frac{8}{16}$	$\frac{9}{20}$	$4 \times 3 \times \frac{7}{16}$	$4 \times 3 \times \frac{8}{20}$
66	22	$\frac{6}{16}$	$\frac{7}{20}$	17	$\frac{5}{16}$	$\frac{6}{20}$	18 $\frac{1}{2}$	$\frac{5}{16}$	$\frac{6}{20}$	14 $\frac{1}{2}$	$\frac{5}{16}$	$\frac{6}{20}$	...	...	...	$\frac{8}{16}$	$\frac{9}{20}$	$4\frac{1}{2} \times 3 \times \frac{7}{16}$	$4\frac{1}{2} \times 3 \times \frac{8}{20}$
69	23	$\frac{6}{16}$	$\frac{7}{20}$	18	$\frac{5}{16}$	$\frac{6}{20}$	19	$\frac{5}{16}$	$\frac{6}{20}$	15 $\frac{1}{2}$	$\frac{5}{16}$	$\frac{6}{20}$	...	...	...	$\frac{8}{16}$	$\frac{9}{20}$	$4\frac{1}{2} \times 3 \times \frac{8}{16}$	$4\frac{1}{2} \times 3 \times \frac{9}{20}$
72	24	$\frac{6}{16}$	$\frac{7}{20}$	19	$\frac{5}{16}$	$\frac{6}{20}$	20	$\frac{5}{16}$	$\frac{6}{20}$	16	$\frac{5}{16}$	$\frac{6}{20}$	...	...	...	$\frac{8}{16}$	$\frac{9}{20}$	$4\frac{1}{2} \times 3 \times \frac{8}{16}$	$4\frac{1}{2} \times 3 \times \frac{9}{20}$
75	25	$\frac{7}{16}$	$\frac{8}{20}$	19 $\frac{1}{2}$	$\frac{6}{16}$	$\frac{7}{20}$	21	$\frac{6}{16}$	$\frac{7}{20}$	16 $\frac{1}{2}$	$\frac{6}{16}$	$\frac{7}{20}$	...	...	...	$\frac{9}{16}$	$\frac{10}{20}$	$5 \times 3 \times \frac{8}{16}$	$5 \times 3 \times \frac{9}{20}$
78	26	$\frac{7}{16}$	$\frac{8}{20}$	20	$\frac{6}{16}$	$\frac{7}{20}$	21 $\frac{1}{2}$	$\frac{6}{16}$	$\frac{7}{20}$	17 $\frac{1}{2}$	$\frac{6}{16}$	$\frac{7}{20}$	...	...	...	$\frac{9}{16}$	$\frac{10}{20}$	$5 \times 3 \times \frac{9}{16}$	$5 \times 3 \times \frac{10}{20}$
81	27	$\frac{8}{16}$	$\frac{9}{20}$	21	$\frac{6}{16}$	$\frac{7}{20}$	22 $\frac{1}{2}$	$\frac{6}{16}$	$\frac{7}{20}$	18	$\frac{6}{16}$	$\frac{7}{20}$	...	...	...	$\frac{9}{16}$	$\frac{10}{20}$	$5 \times 3\frac{1}{2} \times \frac{9}{16}$	$5 \times 3\frac{1}{2} \times \frac{10}{20}$
84	28	$\frac{8}{16}$	$\frac{9}{20}$	22	$\frac{6}{16}$	$\frac{7}{20}$	23	$\frac{6}{16}$	$\frac{7}{20}$	18 $\frac{1}{2}$	$\frac{6}{16}$	$\frac{7}{20}$	$3\frac{1}{2} \times 3 \times \frac{7}{16}$	$3\frac{1}{2} \times 3 \times \frac{8}{20}$	$1\frac{0}{16}$	$\frac{11}{20}$	$5 \times 3\frac{1}{2} \times \frac{9}{16}$	$5 \times 3\frac{1}{2} \times \frac{10}{20}$	
87	29	$\frac{8}{16}$	$\frac{9}{20}$	22 $\frac{1}{2}$	$\frac{6}{16}$	$\frac{7}{20}$	24	$\frac{6}{16}$	$\frac{7}{20}$	19 $\frac{1}{2}$	$\frac{6}{16}$	$\frac{7}{20}$	$4 \times 3 \times \frac{7}{16}$	$4 \times 3 \times \frac{8}{20}$	$1\frac{0}{16}$	$\frac{11}{20}$	$5\frac{1}{2} \times 4 \times \frac{7}{16}$	$5\frac{1}{2} \times 4 \times \frac{8}{20}$	
90	30	$\frac{8}{16}$	$\frac{9}{20}$	23	$\frac{7}{16}$	$\frac{8}{20}$	25	$\frac{7}{16}$	$\frac{8}{20}$	20	$\frac{6}{16}$	$\frac{7}{20}$	$4 \times 3 \times \frac{8}{16}$	$4 \times 3 \times \frac{9}{20}$	$1\frac{0}{16}$	$\frac{11}{20}$	$6 \times 4 \times \frac{7}{16}$	$6 \times 4 \times \frac{8}{20}$	
93	31	$\frac{9}{16}$	$\frac{10}{20}$	24	$\frac{7}{16}$	$\frac{8}{20}$	26	$\frac{7}{16}$	$\frac{8}{20}$	20 $\frac{1}{2}$	$\frac{6}{16}$	$\frac{7}{20}$	$4\frac{1}{2} \times 3 \times \frac{8}{16}$	$4\frac{1}{2} \times 3 \times \frac{9}{20}$	$1\frac{1}{16}$	$\frac{12}{20}$	$6 \times 4 \times \frac{7}{16}$	$6 \times 4 \times \frac{8}{20}$	
96	32	$\frac{9}{16}$	$\frac{10}{20}$	25	$\frac{7}{16}$	$\frac{8}{20}$	26 $\frac{1}{2}$	$\frac{7}{16}$	$\frac{8}{20}$	21	$\frac{6}{16}$	$\frac{7}{20}$	$5 \times 3 \times \frac{8}{16}$	$5 \times 3 \times \frac{9}{20}$	$1\frac{1}{16}$	$\frac{12}{20}$	$6 \times 4 \times \frac{7}{16}$	$6 \times 4 \times \frac{8}{20}$	

IRON AND STEEL BOWSPRITS.

LENGTH OUTSIDE BED.	BED.		HEEL.		CAP.		Sizes of Angle Bar.	LENGTH OUTSIDE BED.	BED.		HEEL.		CAP.		Sizes of Angle Bar.								
	Diam.	Th'kn'ss	Diam.	Th'kn'ss	Diam.	Th'kn'ss			Diam.	Th'kn'ss	Diam.	Th'kn'ss	Diam.	Th'kn'ss									
		Irn. Stl.		Irn. Stl.		Irn. Stl.		Irn. Stl.		Irn. Stl.		Irn. Stl.		Irn. Stl.									
Ft.	ins.	ins.	ins.	ins.	ins.	ins.			ins.	ins.	ins.	ins.	ins.	ins.									
14	16 $\frac{1}{2}$	5 $\frac{5}{6}$	6 $\frac{6}{20}$	14	5 $\frac{5}{6}$	6 $\frac{6}{20}$	12	4 $\frac{4}{6}$	5 $\frac{5}{6}$	2 $\frac{1}{2}$ × 2 × $\frac{5}{16}$	2 $\frac{1}{2}$ × 2 × $\frac{6}{20}$	21	25 $\frac{1}{2}$	7 $\frac{7}{16}$	8 $\frac{8}{20}$	21	6 $\frac{6}{16}$	7 $\frac{7}{20}$	17 $\frac{1}{2}$ 3 $\frac{3}{2}$ × 3 × $\frac{6}{16}$	3 $\frac{3}{2}$ × 3 × $\frac{7}{20}$			
15	17 $\frac{1}{2}$	5 $\frac{5}{6}$	6 $\frac{6}{20}$	15	5 $\frac{5}{6}$	6 $\frac{6}{20}$	12 $\frac{1}{2}$	5 $\frac{5}{6}$	6 $\frac{6}{20}$	2 $\frac{1}{2}$ × 2 × $\frac{5}{16}$	2 $\frac{1}{2}$ × 2 × $\frac{6}{20}$	22	26 $\frac{1}{2}$	7 $\frac{7}{16}$	8 $\frac{8}{20}$	22	6 $\frac{6}{16}$	7 $\frac{7}{20}$	18 $\frac{1}{2}$ 4 × 3 × $\frac{7}{16}$	4 × 3 × $\frac{8}{20}$			
16	19	5 $\frac{5}{6}$	6 $\frac{6}{20}$	16	5 $\frac{5}{6}$	6 $\frac{6}{20}$	13	5 $\frac{5}{6}$	6 $\frac{6}{20}$	3 × 2 × $\frac{5}{16}$	3 × 2 × $\frac{6}{20}$	23	28	8 $\frac{8}{16}$	9 $\frac{9}{20}$	23	7 $\frac{7}{16}$	8 $\frac{8}{20}$	19	6 $\frac{6}{16}$	7 $\frac{7}{20}$	4 × 3 $\frac{1}{2}$ × $\frac{7}{16}$	4 × 3 $\frac{1}{2}$ × $\frac{8}{20}$
17	20	6 $\frac{6}{16}$	7 $\frac{7}{20}$	17	6 $\frac{6}{16}$	7 $\frac{7}{20}$	14	5 $\frac{5}{6}$	6 $\frac{6}{20}$	3 × 2 × $\frac{5}{16}$	3 × 2 × $\frac{6}{20}$	24	29	8 $\frac{8}{16}$	9 $\frac{9}{20}$	24	7 $\frac{7}{16}$	8 $\frac{8}{20}$	20	6 $\frac{6}{16}$	7 $\frac{7}{20}$	4 × 3 $\frac{1}{2}$ × $\frac{7}{16}$	4 × 3 $\frac{1}{2}$ × $\frac{8}{20}$
18	21 $\frac{1}{2}$	6 $\frac{6}{16}$	7 $\frac{7}{20}$	18	6 $\frac{6}{16}$	7 $\frac{7}{20}$	15	5 $\frac{5}{6}$	6 $\frac{6}{20}$	3 × 2 $\frac{1}{2}$ × $\frac{5}{16}$	3 × 2 $\frac{1}{2}$ × $\frac{6}{20}$	25	30	8 $\frac{8}{16}$	9 $\frac{9}{20}$	25	7 $\frac{7}{16}$	8 $\frac{8}{20}$	21	6 $\frac{6}{16}$	7 $\frac{7}{20}$	4 $\frac{1}{2}$ × 3 $\frac{1}{2}$ × $\frac{8}{16}$	4 $\frac{1}{2}$ × 3 $\frac{1}{2}$ × $\frac{9}{20}$
19	23	6 $\frac{6}{16}$	7 $\frac{7}{20}$	19	6 $\frac{6}{16}$	7 $\frac{7}{20}$	16	5 $\frac{5}{6}$	6 $\frac{6}{20}$	3 × 3 × $\frac{6}{16}$	3 × 3 × $\frac{7}{20}$	26	31 $\frac{1}{2}$	8 $\frac{8}{16}$	9 $\frac{9}{20}$	26	7 $\frac{7}{16}$	8 $\frac{8}{20}$	21 $\frac{1}{2}$	6 $\frac{6}{16}$	7 $\frac{7}{20}$	4 $\frac{1}{2}$ × 3 $\frac{1}{2}$ × $\frac{8}{16}$	4 $\frac{1}{2}$ × 3 $\frac{1}{2}$ × $\frac{9}{20}$
20	24 $\frac{1}{2}$	7 $\frac{7}{16}$	8 $\frac{8}{20}$	20	6 $\frac{6}{16}$	7 $\frac{7}{20}$	16 $\frac{1}{2}$	6 $\frac{6}{16}$	7 $\frac{7}{20}$	3 $\frac{1}{2}$ × 3 × $\frac{6}{16}$	3 $\frac{1}{2}$ × 3 × $\frac{7}{20}$	27	33	8 $\frac{8}{16}$	9 $\frac{9}{20}$	27	7 $\frac{7}{16}$	8 $\frac{8}{20}$	22	6 $\frac{6}{16}$	7 $\frac{7}{20}$	4 $\frac{1}{2}$ × 3 $\frac{1}{2}$ × $\frac{8}{16}$	4 $\frac{1}{2}$ × 3 $\frac{1}{2}$ × $\frac{9}{20}$

FOOTNOTE.—The length for regulating the scantlings of the mast to be taken in all cases, from the cap to the top of the keelson.

RULES FOR THE CONSTRUCTION OF IRON AND STEEL MASTS,
BOWSPRITS, AND YARDS.

(Tables 9 and 10.)

1. If Iron be used in the construction of masts, bowsprits, and yards, it is to be of good malleable quality quite free from surface or other defects, and to stand a tensile strain of 20 tons to the square inch and the following bending tests when cold without fracture:—

THICKNESS OF PLATES	TO BEND COLD THROUGH AN ANGLE OF	
	With the Grain.	Across the Grain.
$\frac{9}{16}$	25°	8°
$\frac{8}{16}$	30°	11°
$\frac{7}{16}$	37°	13°
$\frac{6}{16}$	47°	15°
$\frac{5}{16}$	55°	17°
$\frac{4}{16}$	65°	20°
$\frac{3}{16}$	70°	25°

2. The plates to be bent over a slab, the corner of which should be rounded with a radius of half an inch.

3. If Steel be adopted it is to be of the quality required for ship plates and subjected to the same tests:—

4. LOWER MASTS.—The plating to be of the thickness, and the plates arranged as in the Table. The seams to be double riveted; in masts not exceeding 84 feet in length, the edges may be single riveted provided angle bars be fitted to the satisfaction of the Committee. The butts below the mast partners in masts, and those inside the wedging of bowsprits, might be double riveted, the remainder should be treble riveted.

5. The buttstraps in all cases should be $\frac{1}{16}$ of an inch thicker than the plates they connect in iron masts; in steel masts the buttstraps should be $\frac{1}{20}$ of an inch thicker than the plates in double riveted butts and $\frac{2}{20}$ thicker in treble riveted butts. The buttstraps would be better to be fitted on the outside of the masts and bowsprit.

6. The mast and bowsprit plates should be doubled all round in way of the wedging, or otherwise efficiently strengthened; where masts are wedged at the lower deck, the doubling should extend from below the lower deck to above the upper deck.

7. The heels of all masts and their steps should be efficiently strengthened. The cheeks of masts should be stiffened by angles or cope iron on their foremost edges; or by some other approved plan.

8. Where two plates in the round are adopted instead of three the iron is to be of such superior quality as to admit of its being bent to the required form, without being unduly heated and without fracture, and in all such cases the masts should be additionally stiffened by 3 angles as provided for in the Tables.

9. All masts of above 84 feet in length, to be fitted with angles properly shifted and extending the whole length of the mast. If the plates be arranged as described in the Tables, there should be an angle bar fitted to each plate in the round, of the size given in the Table.

10. All bowsprits exceeding 28 inches in diameter should have a vertical diaphragm plate extending from within the wedging to the gammoning, connected by continuous single angle bars to the upper and lower parts of the bowsprit, and two additional angle bars of the size given in the Table; and bowsprits 28 inches in diameter and under, to have an angle bar at the centre of each plate extending the whole length of the bowsprit.

11. The diameter of the lower masts at the cap to be in no case less than that of the topmast at this place, or of the lower topsail yard.

12. The attention of the Surveyors is to be specially directed to the fittings connected with the masts and rigging, in order to ensure the workmanship, material, and sizes of the same being efficient.

13. The mizenmasts for barques may be reduced one-fifth in diameter from that given in the Table, and the plating to be not less than the thickness corresponding to the diameters.

14. Where a Steamer is intended to be fitted with masts or a bowsprit for auxiliary purposes, they may be one-eighth less in diameter than prescribed by Table; and when a mast of a steamer is to carry fore and aft sail only, the diameter may be one-fifth less than given in the Table. The seams of these masts may be single riveted.

15. When pole masts are fitted, the length of the lower mast, in determining the diameter and thickness of plating, should be taken from the heel to the cap band, so as to include the head, as in an ordinary mast; and in sailing vessels these masts to be additionally strengthened by angles from below the lower yard to the topmast cap, or compensating strength furnished. The cheek plates in pole masts may be of the same thickness as the mast plates at the hounds.

16. The eye-bolts, hoops, cleats and bands, are to be of the best description of wrought iron.

17. Any deviations from these Rules and Tables must be submitted for the consideration of the Committee.

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TABLE 10.

YARDS and TOPMASTS of SAILING VESSELS and FULL-RIGGED STEAM VESSELS.

YARDS.														TOPMASTS.																	
Length Cleated	Centre				First Quarter				Second Quarter				Third Quarter.				Ends at Cleats.				Length.	Heel.				Lower Part of Head.				Head.	
	Diameter.		Thickness.		Diameter.		Thickness.		Diameter.		Thickness.		Diameter.		Thickness.		Diameter.		Thickness.			Diameter.		Thickness.		Diameter.		Thickness.			
	Diameter.		Iron.	Steel.	Diameter.		Iron.	Steel.	Diameter.		Iron.	Steel.	Diameter.		Iron.	Steel.	Diameter.		Iron.	Steel.		Diameter.		Iron.	Steel.	Diameter.		Iron.	Steel.		
Feet.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Feet.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.		
32	8	8	1 3/16	1 3/16	7 7/8	7 7/8	3/16	3/16	7 1/4	7 1/4	3/16	3/16	6	6	3/16	3/16	4	4	2/16	2/16	32	12	12	4 1/16	5 2/10	10 1/2	1 4/16	5 2/10	9	9 1/6	3 3/16
36	9	9	1 3/16	1 3/16	8 3/4	8 3/4	3/16	3/16	8 1/8	8 1/8	3/16	3/16	6 3/4	6 3/4	3/16	3/16	4 1/2	4 1/2	2/16	2/16	34	12 1/2	12 1/2	4 1/16	5 5/20	11	1 4/16	5 5/20	9 1/2	9 1/2	3 3/16
40	10	10	1 3/16	1 3/16	9 3/4	9 3/4	3/16	3/16	9	9	3/16	3/16	7 1/2	7 1/2	3/16	3/16	5	5	2/16	2/16	36	13	13	4 1/16	5 5/20	11 1/2	1 4/16	5 5/20	10	1 3/16	3 3/16
44	11	11	1 3/16	1 3/16	10 3/4	10 3/4	3/16	3/16	10	10	3/16	3/16	8 1/4	8 1/4	3/16	3/16	5 1/2	5 1/2	2/16	2/16	38	14	14	4 1/16	5 5/20	12 1/2	1 4/16	5 5/20	10 1/2	1 3/16	3 3/16
48	12	12	4/16	5/20	11 3/4	11 3/4	4/16	5/20	10 3/4	10 3/4	3/16	3/16	9	9	3/16	3/16	6	6	2/16	2/16	40	14 1/2	14 1/2	4 1/16	5 5/20	13	1 4/16	5 5/20	11	1 3/16	3 3/16
52	13	13	4/16	5/20	12 5/8	12 5/8	4/16	5/20	11 3/4	11 3/4	3/16	3/16	9 3/4	9 3/4	3/16	3/16	6 1/2	6 1/2	2/16	2/16	42	15	15	5 5/16	6 6/20	13 1/2	1 4/16	5 5/20	11 1/2	1 4/16	5 5/20
56	14	14	4/16	5/20	13 5/8	13 5/8	4/16	5/20	12 5/8	12 5/8	4/16	5/20	10 1/2	10 1/2	3/16	3/16	7	7	2/16	2/16	44	16	16	5 5/16	6 6/20	14	1 4/16	5 5/20	12	1 4/16	5 5/20
60	15	15	4/16	5/20	14 5/8	14 5/8	4/16	5/20	13 1/2	13 1/2	4/16	5/20	11 1/4	11 1/4	3/16	3/16	7 1/2	7 1/2	2/16	2/16	46	16 1/2	16 1/2	5 5/16	6 6/20	14 1/2	1 4/16	5 5/20	12 1/2	1 4/16	5 5/20
64	16	16	5/16	6/20	15 5/8	15 5/8	5/16	6/20	14 3/8	14 3/8	5/16	6/20	12	12	4/16	5/20	8	8	3/16	3/16	48	17	17	6 6/16	7 7/20	15	1 5/16	6 6/20	13	1 5/16	6 6/20
68	17	17	5/16	6/20	16 1/2	16 1/2	5/16	6/20	15 1/4	15 1/4	5/16	6/20	12 3/4	12 3/4	4/16	5/20	8 1/2	8 1/2	3/16	3/16	50	18	18	6 6/16	7 7/20	16	1 5/16	6 6/20	13 1/2	1 5/16	6 6/20
72	18	18	5/16	6/20	17 1/2	17 1/2	5/16	6/20	16 1/4	16 1/4	5/16	6/20	13 1/2	13 1/2	4/16	5/20	9	9	3/16	3/16	52	18 1/2	18 1/2	6 6/16	7 7/20	16 1/2	1 5/16	6 6/20	14	1 5/16	6 6/20
76	19	19	6/16	7/20	18 1/2	18 1/2	5/16	6/20	17 1/8	17 1/8	5/16	6/20	14 1/4	14 1/4	4/16	5/20	9 1/2	9 1/2	3/16	3/16	54	19	19	6 6/16	7 7/20	17	1 5/16	6 6/20	14 1/2	1 5/16	6 6/20
80	20	20	6/16	7/20	19 1/2	19 1/2	5/16	6/20	18	18	5/16	6/20	15	15	4/16	5/20	10	10	3/16	3/16	56	20	20	6 6/16	7 7/20	18	1 5/16	6 6/20	15	1 5/16	6 6/20
84	21	21	7/16	8/20	20 1/2	20 1/2	6/16	7/20	19	19	5/16	6/20	15 3/4	15 3/4	5/16	6/20	10 1/2	10 1/2	4/16	5/20	58	20 1/2	20 1/2	6 6/16	7 7/20	18 1/2	1 5/16	6 6/20	15 1/2	1 5/16	6 6/20
88	22	22	7/16	8/20	21 1/2	21 1/2	6/16	7/20	19 3/4	19 3/4	5/16	6/20	16 1/2	16 1/2	5/16	6/20	11	11	4/16	5/20	60	21	21	6 6/16	7 7/20	19	1 5/16	6 6/20	16	1 5/16	6 6/20
92	23	23	7/16	8/20	22 1/2	22 1/2	6/16	7/20	20 3/4	20 3/4	6/16	7/20	17 1/4	17 1/4	5/16	6/20	11 1/2	11 1/2	4/16	5/20	62	22	22	6 6/16	7 7/20	20	1 5/16	6 6/20	16 1/2	1 5/16	6 6/20
96	24	24	7/16	8/20	23 3/8	23 3/8	6/16	7/20	21 5/8	21 5/8	6/16	7/20	18	18	5/16	6/20	12	12	4/16	5/20	64	23	23	6 6/16	7 7/20	21	1 5/16	6 6/20	17	1 5/16	6 6/20

Topmasts.—The plating should be of the thickness given in the Table. The seams of topmasts may be single riveted; the butts should be treble riveted, and their straps $\frac{1}{16}$ of an inch thicker in iron topmasts, and $\frac{1}{32}$ thicker in steel than the plates they connect. There should be doubling plates in the way of the lower mast cap. Topmasts should be efficiently strengthened in the way of the fid holes, and in the way of sheave holes where such are cut, by the doubling plates, iron hoops, or by other approved methods.

Topmasts above 38 feet in length and not exceeding 46 feet, to have two stiffening angles $3'' \times 2\frac{1}{2}'' \times \frac{8}{16}$ fitted as nearly as practicable at the fore and after parts of the mast.

When the length of the topmasts exceeds 46 feet, efficient cheek plates are

When the length of the topmasts exceeds 10 feet, efficient check plates are to be fitted to the same.

The diameter of the topmasts at the lower cap, sheave hole, and topmast cap, to be in no case less than that of the yards at these places.

Lower Yards.—The plating should be of the thickness given in the Table. The seams of yards may be single riveted; their butts should be treble riveted, and connected by being overlapped, or by efficient butt straps. The plates should be doubled at the centre, and the doubling plates should extend beyond the truss hoops.

Where iron or steel masts and yards are to be constructed otherwise than in accordance with the Tables, plans and particulars of the same must be submitted for the approval of the Committee.

Where Steamers are intended to be fitted with topmasts for auxiliary purposes, they might be one-eighth less in diameter than prescribed by Table.

SIZES and TESTS for the STEEL WIRE STANDING RIGGING, &c.,
of SAILING SHIPS.

TABLE 11.

(See Continuation.)

REGISTER TONNAGE UNDER DECK.					Tons. Above 3000 and not exceeding 3500	Tons. Above 2800 and not exceeding 3000	Tons. Above 2300 and not exceeding 2600	Tons. Above 2000 and not exceeding 2300	Tons. Above 1800 and not exceeding 2000	Tons. Above 1600 and not exceeding 1800	Tons. Above 1400 and not exceeding 1600
LONGITUDINAL NUMBER.					Above 24200 and not exceeding 27200	Above 21900 and not exceeding 24200	Above 20000 and not exceeding 21900	Above 18400 and not exceeding 20000	Above 17000 and not exceeding 18400	Above 15600 and not exceeding 17000	Above 14200 and not exceeding 15600
FORE & MAIN Shrouds ...	...	...	...	...	No. Size. 6 $5\frac{1}{2}$ and 2 cap	No. Size. 6 $5\frac{1}{4}$ and 2 cap	No. Size. 6 5 and cap	No. Size. 6 $4\frac{7}{8}$ and cap	No. Size. 6 $4\frac{3}{4}$ and cap	No. Size. 6 $4\frac{1}{2}$ and cap	No. Size. 6 $4\frac{1}{4}$ and cap
„ „ Chain plates	...	...	...	...	$2\frac{3}{4}$	$2\frac{5}{8}$	$2\frac{1}{2}$	$2\frac{3}{8}$	$2\frac{1}{4}$	$2\frac{1}{8}$	2
„ „ Dead-eyes	...	...	...	...	—	—	—	—	—	12×7	$11\frac{1}{2} \times 6\frac{1}{2}$
„ „ Lanyards (hemp)	...	...	...	...	—	—	—	—	6	—	$5\frac{3}{4}$
„ „ {Rigging Screws, Diameter at bottom of thread}	...	...	...	...	$2\frac{1}{4}$	$2\frac{1}{8}$	2	$1\frac{7}{8}$	$1\frac{7}{8}$	$1\frac{3}{4}$	$1\frac{3}{4}$
„ „ Rigging Screws, Diameter of Pins	...	...	...	...	2	$1\frac{7}{8}$	$1\frac{3}{4}$	$1\frac{5}{8}$	$1\frac{5}{8}$	$1\frac{1}{2}$	$1\frac{1}{2}$
„ „ Topmast backstays	...	...	...	...	3 $5\frac{1}{2}$	3 $5\frac{1}{4}$	3 5	3 $4\frac{7}{8}$	3 $4\frac{3}{4}$	3 $4\frac{1}{2}$	3 $4\frac{1}{4}$
„ „ Top-gallant backstays	...	...	...	...	2 $4\frac{1}{4}$	2 $4\frac{1}{8}$	2 $3\frac{7}{8}$	2 $3\frac{3}{4}$	2 $3\frac{1}{2}$	2 $3\frac{1}{4}$	2 3
„ „ Lower stays	...	...	...	...	2 $5\frac{1}{2}$	2 $5\frac{1}{4}$	2 5	2 $4\frac{7}{8}$	2 $4\frac{3}{4}$	2 $4\frac{1}{2}$	2 $4\frac{1}{4}$
„ „ Topmast stays	...	...	...	...	2 $5\frac{1}{2}$	2 $5\frac{1}{4}$	2 5	2 $4\frac{7}{8}$	2 $4\frac{3}{4}$	2 $4\frac{1}{2}$	2 $4\frac{1}{4}$
„ „ Top-gallant stays	...	...	...	...	$4\frac{1}{4}$	$4\frac{1}{8}$	$3\frac{7}{8}$	$3\frac{3}{4}$	$3\frac{1}{2}$	$3\frac{1}{4}$	3
MIZEN Shrouds ...	...	...	...	...	5 $4\frac{1}{2}$ and cap	5 $4\frac{3}{8}$ and cap	5 $4\frac{1}{4}$ and cap	5 $4\frac{1}{8}$ and cap	5 4 and cap	5 $3\frac{3}{4}$ and cap	5 $3\frac{1}{2}$ and cap
„ Topmast backstays	...	...	...	...	3 $4\frac{1}{2}$	3 $4\frac{3}{8}$	3 $4\frac{1}{4}$	3 $4\frac{1}{8}$	3 4	3 $3\frac{3}{4}$	3 $3\frac{1}{2}$
„ Top-gallant backstays	...	...	...	...	2 $3\frac{1}{4}$	2 $3\frac{1}{8}$	2 3	2 $2\frac{7}{8}$	2 $2\frac{3}{4}$	2 $2\frac{1}{2}$	2 $2\frac{1}{4}$
„ Lower stays	...	...	...	...	2 $4\frac{1}{2}$	2 $4\frac{3}{8}$	2 $4\frac{1}{4}$	2 $4\frac{1}{8}$	2 4	2 $3\frac{3}{4}$	2 $3\frac{1}{2}$
„ Topmast stays	...	...	...	...	2 $4\frac{1}{2}$	2 $4\frac{3}{8}$	2 $4\frac{1}{4}$	2 $4\frac{1}{8}$	2 4	2 $3\frac{3}{4}$	2 $3\frac{1}{2}$
„ Top-gallant stays	...	...	...	...	$3\frac{1}{4}$	$3\frac{1}{8}$	3	$2\frac{7}{8}$	$2\frac{3}{4}$	$2\frac{1}{2}$	$2\frac{1}{4}$
BOBSTAY Bar	...	...	...	...	$4\frac{1}{8}$	$4\frac{1}{8}$	4	$3\frac{7}{8}$	$3\frac{3}{4}$	$3\frac{5}{8}$	$3\frac{1}{2}$
„ Pin	...	...	...	...	$3\frac{1}{8}$	$3\frac{1}{8}$	3	$2\frac{7}{8}$	$2\frac{3}{4}$	$2\frac{5}{8}$	$2\frac{1}{2}$
„ Chain	...	...	...	...	$2\frac{1}{16}$	$2\frac{1}{16}$	2	$1\frac{1}{16}$	$1\frac{1}{16}$	$1\frac{1}{16}$	$1\frac{1}{16}$
BOWSPRIT Shrouds (Chain)	...	...	...	...	2 $1\frac{1}{8}$	2 $1\frac{1}{8}$	2 $1\frac{1}{16}$	2 $1\frac{1}{16}$	2 1	2 1	2 $\frac{7}{8}$

STEEL WIRE STANDING RIGGING.

Size (inches) ...	...	5 $\frac{1}{2}$	5 $\frac{1}{4}$	5	4 $\frac{7}{8}$	4 $\frac{3}{4}$	4 $\frac{5}{8}$	4 $\frac{1}{2}$	4 $\frac{3}{8}$	4 $\frac{1}{4}$	4 $\frac{1}{8}$	4	3 $\frac{7}{8}$	3 $\frac{3}{4}$	3 $\frac{5}{8}$	3 $\frac{1}{2}$	3 $\frac{3}{8}$	3 $\frac{1}{4}$
Breaking Test (tons) ...	...	58	53	48	44	42	40	38	36	34	32	30	28	26	24	22	20 $\frac{1}{2}$	19
Size (inches) ...	...	3 $\frac{1}{8}$	3	2 $\frac{7}{8}$	2 $\frac{3}{4}$	2 $\frac{5}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2	1 $\frac{7}{8}$	1 $\frac{3}{4}$	1 $\frac{5}{8}$	1 $\frac{1}{2}$	1 $\frac{3}{8}$	1 $\frac{1}{4}$	
Breaking Test (tons) ...	...	17 $\frac{1}{2}$	16	14 $\frac{1}{2}$	13	12	11	10	9	8	7	6	5 $\frac{1}{2}$	5	4	3 $\frac{1}{4}$	3	

SIZES and TESTS for the STEEL WIRE STANDING RIGGING, &c.,
of SAILING SHIPS.

TABLE 11.

(Concluded.)

REGISTER TONNAGE UNDER DECK.	Tons. Above 1200 and not exceeding 1400	Tons. Above 1000 and not exceeding 1200	Tons. Above 800 and not exceeding 1000	Tons. Above 700 and not exceeding 800	Tons. Above 600 and not exceeding 700	Tons. Above 500 and not exceeding 600	Tons. Above 400 and not exceeding 500	Tons. Above 300 and not exceeding 400
LONGITUDINAL NUMBER.	Above 12800 and not exceeding 14200	Above 11400 and not exceeding 12800	Above 10000 and not exceeding 11400	Above 9000 and not exceeding 10000	Above 8000 and not exceeding 9000	Above 7100 and not exceeding 8000	Above 6200 and not exceeding 7100	Above 4900 and not exceeding 6200
FORE & MAIN Shrouds	No. Size. 6 $4\frac{1}{8}$ and cap	No. Size. 6 4 and cap	No. Size. 5 $3\frac{3}{4}$ and cap	No. Size. 5 $3\frac{1}{2}$ and cap	No. Size. 5 $3\frac{1}{4}$ and cap	No. Size. 5 3 and cap	No. Size. 4 $2\frac{3}{4}$ and cap	No. Size. 4 $2\frac{1}{2}$ and cap
„ „ Chain Plates	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{5}{8}$	1 $\frac{3}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$
„ „ Dead-eyes	10 $\frac{1}{2} \times 6$	10 × 6	9 $\frac{1}{2} \times 5\frac{1}{2}$	9 × 5 $\frac{1}{2}$	8 $\frac{1}{2} \times 5$	8 × 5	7 $\frac{1}{2} \times 4\frac{1}{2}$	7 × 4 $\frac{1}{2}$
„ „ Lanyards (hemp)	5 $\frac{1}{4}$	5	4 $\frac{3}{4}$	4 $\frac{1}{2}$	4 $\frac{1}{4}$	4	3 $\frac{3}{4}$	3 $\frac{1}{2}$
„ „ { Rigging Screws, Diameter at bottom of thread }	1 $\frac{5}{8}$	1 $\frac{5}{8}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{3}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
„ „ Rigging Screws, Diameter of Pins	1 $\frac{3}{8}$	1 $\frac{3}{8}$	1 $\frac{3}{8}$	1 $\frac{3}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{8}$	1	1
„ „ Topmast backstays	3 $4\frac{1}{8}$	3 4	2 $3\frac{3}{4}$	2 $3\frac{1}{2}$	2 $3\frac{1}{4}$	2 3	2 $2\frac{3}{4}$	2 $2\frac{1}{2}$
„ „ Top-gallant backstays	2 $2\frac{3}{4}$	2 $2\frac{5}{8}$	2 $2\frac{1}{2}$	2 $2\frac{3}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2	1 $\frac{3}{4}$
„ „ Lower stays	2 $4\frac{1}{8}$	2 4	2 $3\frac{3}{4}$	2 $3\frac{1}{2}$	2 $3\frac{1}{4}$	2 3	2 $2\frac{3}{4}$	2 $2\frac{1}{2}$
„ „ Topmast stays	2 $4\frac{1}{8}$	2 4	2 $3\frac{3}{4}$	2 $3\frac{1}{2}$	3 $\frac{1}{4}$	3	2 $\frac{3}{4}$	2 $\frac{1}{2}$
„ „ Top-gallant stays	2 $\frac{3}{4}$	2 $\frac{5}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2	1 $\frac{3}{4}$
MIZEN Shrouds	5 $3\frac{1}{4}$ and cap	5 3	5 $2\frac{7}{8}$	5 $2\frac{3}{4}$	4 $2\frac{5}{8}$	4 $2\frac{1}{2}$	3 $2\frac{3}{8}$	3 $2\frac{1}{4}$
„ Topmast backstays	3 $3\frac{1}{4}$	3 3	2 $2\frac{7}{8}$	2 $2\frac{3}{4}$	2 $2\frac{5}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{4}$
„ Top-gallant backstays	2 $2\frac{1}{8}$	2 2	1 $\frac{7}{8}$	1 $\frac{3}{4}$	1 $\frac{5}{8}$	1 $\frac{1}{2}$	1 $\frac{3}{8}$	1 $\frac{1}{4}$
„ Lower stays	2 $3\frac{1}{4}$	2 3	2 $\frac{7}{8}$	2 $\frac{3}{4}$	2 $\frac{5}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{4}$
„ Topmast stays	2 $3\frac{1}{4}$	3	2 $\frac{7}{8}$	2 $\frac{3}{4}$	2 $\frac{5}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{4}$
„ Top-gallant stays	2 $\frac{1}{8}$	2	1 $\frac{7}{8}$	1 $\frac{3}{4}$	1 $\frac{5}{8}$	1 $\frac{1}{2}$	1 $\frac{3}{8}$	1 $\frac{1}{4}$
BOBSTAY Bar	3 $\frac{1}{4}$	3	2 $\frac{1}{2}$	2 $\frac{1}{4}$	2	2	2	2
„ Pin	2 $\frac{1}{4}$	2 $\frac{1}{8}$	1 $\frac{7}{8}$	1 $\frac{5}{8}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$
„ Chain	1 $1\frac{0}{6}$	1 $\frac{8}{16}$	1 $\frac{6}{16}$	1 $\frac{5}{16}$	1 $\frac{4}{16}$	1 $\frac{4}{16}$	1 $\frac{4}{16}$	1 $\frac{3}{16}$
BOWSPRIT Shrouds (Chain)	2 $\frac{7}{8}$	2 $\frac{1}{16}$	2 $\frac{1}{16}$	2 $\frac{1}{16}$	2 $\frac{1}{16}$	2 $\frac{1}{16}$	2 $\frac{9}{16}$	2 $\frac{9}{16}$

1.—The above requirements are intended to apply to vessels in which the dimensions of the masts and yards are such as would not be deemed unusual for vessels of the respective tonnages; where these dimensions are extreme, or in other exceptional cases where deviations from the above sizes are required, rigging plans showing the sizes and arrangements of the several parts should be submitted for the approval of the Committee.

2.—Where four masts are adopted instead of three, the tonnage of the vessel may be reduced one-fifth, and where five masts are adopted, one fourth, in obtaining the sizes of Rigging, &c., from the above table.

3.—Where pole masts are adopted in vessels requiring one cap shroud only, an additional cap shroud is to be fitted, when the number of lower shrouds may be correspondingly reduced.

4.—Where double top-gallant yards are to be adopted, a topmast cap backstay should be fitted in addition.

5.—The steel wire ropes to be guaranteed to withstand the breaking stress given in the Table, and no hemp is to be used in the strands, a hemp core only to be fitted.

6.—A short length of each of the wires composing the rigging will be required, after being galvanized, to withstand a tensile stress equivalent to that set forth in the Table, and the aggregate strength of the wires must not be less than 10 per cent. in excess of that stress.

7.—Each wire will be required to be capable of being twisted around itself not less than eight times, and of being untwisted and straightened without breaking.

8.—Where it is proposed to adopt iron wire rigging the sizes proposed and the guaranteed tests should be submitted for the consideration of the Committee.

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LLOYD'S REGISTER OF SHIPPING.

SUGGESTIONS FOR COMPOSITE VESSELS.

COMPOSITE VESSELS.

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SUGGESTIONS FOR THE CONSTRUCTION AND CLASSIFICATION OF COMPOSITE SHIPS.

1. All vessels constructed with iron frames, or part iron and wood frames, and wood planking, to be classed A for a term of years,* according to the timber material used in their construction, as set forth in Table I, provided the workmanship be well executed, subject to the surveys and conditions hereinafter stated.

2. The efficient state and condition of the whole of a vessel's equipment will be designated by the figure 1 placed after the character assigned to the vessel ; and in cases in which the equipment is found insufficient in quantity or defective in quality, a dash, thus —, will be inserted in place of the figure 1.

3. When the rules as regards surveys on the hull, machinery or boilers of a steam vessel, or on the hull, masts, spars, or rigging of a sailing vessel have not been complied with, so that the vessel is not entitled to retain her class in the Register Book, the character will be expunged with a red line, under which the date of such withdrawal of class will be recorded.

4. When it is found from *reported defects* in the hull, machinery or boilers of a steam vessel, or in the hull, masts, spars or rigging of a sailing vessel, that the vessel is not entitled to retain her class in the Register Book, the character will be expunged with a black line, under which the date of such withdrawal of class will be recorded.

5. When the class of a vessel is withdrawn from the Register Book by the Committee in consequence of a request from the Owner, the fact will be indicated by the insertion of three dots (...) in column 7 of the list of steam vessels and column 8 of the list of sailing vessels.

VESSELS BUILT UNDER A ROOF.

An additional year will be allowed to vessels built under a substantial and efficient roof, kept in good repair, and which extends on each side beyond the vessel's breadth, and beyond each of her ends to an extent equal to half her midship breadth.

COPPER OR YELLOW METAL BOLTS.

Paragraph No. 1. Two additional years will be allowed to vessels, whether planked with one or two thicknesses, if fastened with wrought copper or yellow metal bolts, from the lower part of keel up to the height of one-fifth of the midship depth of hold below the upper side of the upper deck and parallel thereto forward and aft, in one, two, or three-decked ships, and below the upper side of the main or tonnage deck in spar-decked ships, but the whole of the fastenings above this height may be of iron, if properly galvanized and dowelled or cemented over.

* The terms of years assigned to *Composite Ships* on the Character A will expire on the 31st December of the last year of the periods assigned to them.

Such ships to be marked C. F. (*copper fastened*).

Paragraph No. 2. Three additional years will be allowed, provided the whole of the external fastening from the lower part of keel to the gunwale be of wrought copper or yellow metal bolts to the entire exclusion of iron.

Such ships to be marked C. F. (*copper fastened*).

IRON BOLTS AND GALVANIZED IRON BOLTS.

Vessels will be allowed to be fastened with galvanized or plain iron bolts, if efficiently dowelled or cemented over; but the butt bolts, and also those which are used in fastening the fore hood ends before the iron stem plate, the after hood ends abaft the sternpost plate, extending from the keel up to the height of one-fifth the depth of hold below the upper side of the upper deck, in one, two or three-decked vessels, or below the upper side of the main or tonnage deck in spar-decked vessels, those which fasten the planking to the deadwood, the lower edge of the garboard strakes, and the wood keel, and stem scarphs, must be of wrought copper or yellow metal.

All vessels fastened with galvanized iron to be marked G.I.B. (*Galvanised Iron Bolts*), and with plain iron bolts (I.B.); and in addition all iron-fastened ships will be marked "Expl. T. S." (*Experimental Triennial Survey*).

All vessels fastened with galvanized or plain iron bolts in the bottom, previous to being sheathed with copper or yellow metal, must be sheathed with wood not less than 1½ in. thick, wrought hot on the best hair felt, and properly rabbeted into the stem, stern-post, keel, and into the planking at its upper edge; efficiently fastened to the bottom planks with yellow metal or copper nails, arranged to come between the frames, and be well caulked. The condition of the bolts and caulking of the bottom and planking to be ascertained at the periodical Surveys as per Section 43. The wood sheathing to be allowed to remain on the bottom as long as the bottom planks, bolts, and caulking prove satisfactory.

SURVEYS WHILE BUILDING.

SPECIAL SURVEY.

Section 1. 1. The Surveyors are to examine the whole of the materials and the workmanship as it progresses, from the laying of the keel to the completion of the vessel, and to point out as early as possible anything that is objectionable, or that is not in accordance with the Rules, or with the plans approved by the Committee for the particular vessel.

2. Vessels built under the Special Survey of the Society will be entitled to the distinctive mark \ddagger .
3. In steam vessels built under Special Survey, the Machinery and Boilers must also be constructed under Special Survey. *See* Rules for Machinery.
4. In steam vessels the machinery and boilers are to be inspected throughout construction, the boilers tested by hydraulic pressure, and the machinery tested under steam. Machinery certificates will be granted, and notifications thereof made in the Register Book, thus: "LMC 6,09" in red (*i.e.* LLOYD'S MACHINERY CERTIFICATE, September, 1909).
5. In cases of machinery or new boilers being built under Special Survey, the distinguishing mark \ddagger will be noted in red, thus: " \ddagger LMC," or " \ddagger NE&B," or " \ddagger NB."

6. In cases in which the machinery or boilers are of novel description, or in which experience has not sufficiently shown the safety of the principle or mode of application involved, the words "Machinery Experimental," or "Boiler Experimental," will be inserted under the class of the vessel in the Register Book; but if in the opinion of the Committee the machinery or boilers are so far inefficient as to imperil the vessel's safety, no class will be assigned.

7. If the hull of a steamer has been built in accordance with the Rules, a provisional certificate will be issued, if desired, stating the class to which the vessel will be entitled when the machinery and boilers have been fitted on board in accordance with the Rules, and the Committee's requirements otherwise complied with.

8. For requirements relating to the survey and construction of engines and boilers, *see* Rules for Machinery.

COMMON SURVEY.

Section 2. First.—Examination of the wood keel, stem, stern-post, deadwood, and frames before they are painted or coated.

Second.—Of all the beams, stringers, plates, &c., when in place, riveted-up ready to receive the planking.

Third.—When the vessel is planked outside, dubbed fair, and all the fastenings completed, but before she is either caulked, coated, or cemented, so that the inside and outside of the planking, and the bolts and their nuts, may be carefully examined.

Fourth.—When the vessel is caulked, but before the bolt-heads are cemented or have dowels fitted over them.

Fifth.—When the vessel is completed, launched, and equipped.

SUGGESTIONS AS TO THE BUILDING OF COMPOSITE SHIPS.

QUALITY OF IRON, MAKER'S NAME, AND WORKMANSHIP.

Section 3. 1. The whole of the iron to be of good malleable quality, to be capable of bearing a longitudinal strain of twenty tons per square inch, and all plate, beam, and angle iron, to be legibly stamped in not less than two places with the manufacturer's trade mark, or his name, and the place where made, which is also to be stated in the Report of Survey.

2. Any brittle or inferior iron, defective planking, timber, or other objectionable materials to be rejected.

3. The steel used in the construction of Composite Ships is to be of the quality required for Steel Ships, and is to be tested as required by the Society's Rules for the testing of Steel.

4. The workmanship to be well executed, and submitted to the closest inspection before coating or painting.

RIVETS AND RIVETING.

Section 4. 1. The rivets to be of the best quality, and to be of the diameter as per Table H, the rivet holes to be regularly and equally spaced, and carefully punched opposite each other in the adjoining parts from the faying surfaces in the laps, lining pieces, butt-straps, and frames, and to be countersunk where required; the rivets not to be nearer to the butts or edges of the plating, lining pieces to butts, or

of any angle iron, than a space equal to their own diameter, and not to be farther apart from centre to centre than five times their diameter, or nearer than four times their diameter from centre to centre, and to be spaced through the frames and outside plating, and in reversed angle iron a distance equal to nine times their diameter from centre to centre.

2. All butts of iron plating, excepting those of poops and top-gallant forecastles, to be at least double riveted, and a space equal to twice the diameter of the rivets to be between each row; where treble riveting is adopted, a space equal to twice the diameter of the rivet to be between each row, with half the number of rivets in the back row.

SCANTLINGS.

Section 5. 1. The scantlings given in Table H are intended for ships the length of which, measured from the fore part of stem to the after part of the stern-post, on the range of the upper deck, does not exceed ten times their depth of hold, taken from the upper part of the floors to the top of the upper deck beams, or seven times their moulded breadth.

2. In vessels exceeding ten depths, or seven breadths in length, the builders are to submit their plans for giving them additional longitudinal strength to the Committee, through the Resident Surveyors, who are to express their opinions thereon.

3. The depth for defining the proportions of spar-decked vessels is to be measured from the top of the floor-plates to the upper side of the middle or tonnage deck beams. (*See Section 24.*)

WOOD KEEL.

Section 6. The wood keel to be of the dimensions set forth in Table H, to be free from all defects, the scarphs to be either vertical or horizontal, and to be tabled, the width of the tabling to be one-third the siding or moulding of the keel, as the case may be, and from $\frac{3}{4}$ of an inch to $1\frac{1}{4}$ inch deep, according to the size of the keel, and bolted with copper or yellow metal bolts, which are to be driven on and clenched on rings of the same metal; the bolts are to be in size and number as required by Table K.

GARBOARD STRAKE.

Section 7. The garboard strakes not to be less than two-thirds the depth of keel prescribed in Table H, and properly rabbeted into it, to be fitted closely to the iron keel plate, and to be of sufficient width. The butts of the garboard strake to have not less than four feet six inches shift from the butts of the garboard strake on the opposite side of the vessel, nor less than the same shift clear of the keel scarphs. (For bolting, *see Section 33.*)

STEM AND STERN-POST.

Section 8. The stem and stern-post to be of the dimensions set forth in Table H, and of materials according to class as prescribed in Table I. Where necessary to scarph the stem, it must be a flat scarph, and its length not less than seven-tenths of that prescribed in Table K for keel scarphs, and tabled and bolted in the same manner. The hood ends to be well and efficiently rabbeted into the stem and sternpost.

APRON, INNER STERN-POST AND DEADWOOD.

Section 9. The apron, inner stern-post, and deadwood, to be of materials according to class as prescribed in Table I; the apron and inner sternpost to be of sufficient siding and moulding for the knight-heads and counter timbers respectively, to be secured to them, and to take the hood end fastenings.

SPACING OF IRON FRAMES.

Section 10. The spacing of the iron frames not to exceed 18 inches from moulding edge to moulding edge all fore and aft; a four feet length of angle iron, the size of the frame, is to be riveted to each floor and to the keel plate, back to back with the frame.

KEEL PLATE.

Section 11. The keel plate to be of the breadth and thickness prescribed in Table H, and to be made continuous up the apron and up the inner stern-post as high as practicable, but in all cases to extend above the lower deck or hold beam stringer angle iron. Forward and aft the plate is to be curved to the form of the bearding line, and to be one-sixteenth of an inch thicker than prescribed in the Table, where it passes over the deadwoods, apron, and inner stern-post; and to be sided as required by the form of the vessel, to have an angle iron of the size given in Table H for stringer angle irons riveted on each edge, flanged to the form of the vessel, to receive the plank fastenings. The keel plate to maintain its breadth for three-fifths the length of the keel in midships, and then to be gradually reduced until its edges conform with the flange of the angle iron on the keel plate forward and aft; the butts of the keel plates to be shifted clear of the keel scarphs.

FRAMES.

Section 12. The frames to be of the dimensions set forth in Table H, and the narrow flange to be of a parallel thickness, and the bolts are to be so placed that the nuts of the screw bolts may fit closely to the frames; the frames to be in as long lengths as possible, fitted and riveted on to the keel plate, and extended as near to the middle line as practicable, according to the plan of construction adopted, and in all cases to extend to the gunwale, and where raised quarter decks, poops, forecastles, and spar decks are constructed to extend to their deck stringers respectively, except when constructed of a rounded form at the gunwale, then they may terminate at the lower part of the curve; if the frames be welded, the welds to be perfect with not less than four feet shifts from the welds of next frames, or, if butted, to have not less than four feet shifts with four feet lengths of angle iron of the same size as the frames fitted back to back, riveted to them, and secured to the outside planking.

FLOOR-PLATES.

Section 13. 1. The floor plates to be in thickness according to Table H, but at each end of the vessel, for one quarter of her length, they may be reduced one-sixteenth of an inch where the midship floor-plates are six-sixteenths and under ten-sixteenths of an inch, and two-sixteenths of an inch where the plates are ten-sixteenths and above in thickness.

2. The depth of the floor-plates at middle line to be regulated by the following rule, viz., to the vessel's depth, measured from the top of the keel to the top of the upper or spar deck beams amidships add the extreme breadth of the vessel, two-fifths of that sum in inches to be the depth of the floor-plates at the middle line well fore and aft, but at the extreme fore and after ends they must be deeper, so as to form an efficient connection between the two sides of the vessel.

3. The floor-plates are to extend up the bilges not less than to a perpendicular height of *twice* and *a half* the depth of floors amidships, from upper side of keel at middle line; and in no case to be less moulded in any part than a fair taper between the depth at middle line, and the moulding at their extreme ends, which is to be not less than the moulding of the frames. The ends of the floors to maintain the height prescribed amidships, for one quarter of the vessel's length; they may then be gradually lowered forward and aft until the upper edges of the floor-plates are level, which place is to be determined by the form of the vessel, and from that point to the vessel's ends they are to be gradually increased in depth, so as to efficiently connect the sides of the vessel; the upper parts of the floors forward and aft are to be high enough to give ample room between the reverse frames on each side of the vessel for fitting the keelson angle irons.

4. In vessels having considerable rise of floor, the depth of the floor-plates on a square at the quarter of the vessel's extreme moulded breadth, set out from the middle line, is to be not less than three-fifths the depth of the floor-plate at the middle line, and the floor-plate is to be extended up the bilges by a fair taper from middle line, until it terminates at the moulding of the frames.

5. A floor-plate to be fitted and riveted to every frame and to be extended across the middle line, but, where a vertical centre plate is adopted at middle line, then the floor-plates are to be efficiently connected to it on each side by double vertical angle irons of not less size than the reversed frames.

6. When floors extend from side to side, and are made in two lengths, the butts are to have double butt-straps, one on each side of the floor-plates, and three-fourths the thickness of the floor-plates, or else the floor-plates must be lapped and treble riveted.

WATERCOURSES.

Section 14. Watercourses are to be formed through all the floor-plates, on each side of the middle line, and at the bilges above the frames, so as to allow water to reach the pumps freely, and also through the vertical centre plate, and intercostal keelsons when such keelsons are adopted.

REVERSED FRAMES.

Section 15. Reversed angle irons on frames to be in size as per Table H. All vessels under 200 tons to have reversed angle iron riveted to every frame and floor-plate across the middle line, extended to the height of the upper part of the bilge, and to the gunwale on alternate frames, and to have double reversed angle irons in way of all keelsons and stringers in hold; and in addition all vessels of 200 tons and upwards to have reversed angle iron extended to the upper deck beam stringer on alternate frames, and, where raised quarter decks and spar decks are constructed, to their deck stringers respectively, except when constructed of a rounded form at the gunwale, then they may terminate at the lower part of the curve; and on the remaining frames reversed angle irons are to be fitted to above the height of the lower deck or hold beam stringer angle iron if the vessel has two decks or tiers of beams, and to above the height

of the middle deck beam stringer angle iron if the vessel has three decks or tiers of beams ; the rivets for securing the reversed angle iron to the frames and floor-plates to be in diameter as specified in Table H, and be spaced not to exceed a distance of nine times their own diameter from centre to centre ; butts of reversed angle iron to be secured with butt-straps.

MIDDLE LINE KEELSON.

Section 16. 1. The middle line keelson, if of single plate, and standing above the floor-plates, to be of the thickness prescribed in Table H, to be two-thirds of the depth of floor plates, and to have an angle iron, of the size given in Table H, fitted and riveted on *each* side, top and bottom, extending all fore and aft, the bottom angle irons to be riveted to a foundation plate the breadth of which is to be not less than three and a half times the flange of the angle iron fitted upon it, and the top angle irons to a rider plate on the top, the breadth of which is to be not less than the breadth of the flanges of the angle irons attached to them and the thickness of the keelson plates combined, to be properly shifted, and to be of the thickness given in Table H for box keelson plates, and the lower plates to be riveted to double reversed angle irons attached to each of the floors ; but the foundation plate may be dispensed with if the combined widths of the horizontal flanges of the bottom angle irons are equal to the breadth prescribed for the foundation plate, and double riveted to the angle irons on the floors.

BOX KEELSON.

2. If a box keelson be adopted it is to be formed of plates, properly shifted, of the thickness given in Table H, with a foundation plate, the depth of the box to be not less than two-thirds the depth of the floor-plates, and the breadth of it two thirds of its depth ; the lower angle irons of the box keelson to be of the size given for the frames, and the top ones the size of the reversed frames, and the keelson to be well stayed in way of the masts.

INTERCOSTAL KEELSON.

3. If an intercostal keelson be adopted, it is to be of the thickness prescribed in Table H, and riveted to vertical angle irons of not less size than the reversed frames attached to all floor-plates, the plates to extend from the keel plate to the top of the floors, a bulb plate of not less thickness than the lower deck beams, or other bars of equal strength, to be let down below the top of the floors sufficiently for the intercostal plates to be riveted to them ; in all cases these bars are to be fitted between two longitudinal angle irons on the floors, extending all fore and aft, of the size given for keelson angle iron in Table H, and riveted thereto. The intercostal plates to be fitted close to the floors, and to the flat keel plate.

VERTICAL CENTRE PLATE.

4. If the middle line keelson be formed of a vertical centre plate, extending from the keel plate to the top of the floors, it must be not less in thickness than that given in Table H, riveted to two fore and aft angle irons of the size given for stringer angle irons in Table H, attached to the keel plate. To strengthen the floor-plates transversely at their intersection at the middle line, in addition to double vertical angle irons, of not less size than the reversed frames, riveted to their ends, and to the vertical centre plate, there is to be a flat keelson plate of the same breadth and thickness as to the keel plate, riveted to double reversed angle irons on the upper edge of floors, and to two fore and aft angle irons of the size given for stringer

angle irons in Table H, on the top edge of the vertical centre plate ; but, should the vertical centre plate be extended above the upper edge of the floors, then it is to be riveted to two fore and aft angle irons of the size given in Table H, for stringer angle irons, and to *two* flat plates of the thickness given for box keelson plates, and half the breadth of the keel plates, one on each side of the middle line, which are to be well riveted to double reversed angle irons on the top of each floor, one of these reversed angle irons to reeve through the vertical centre plate, and in all cases the vertical centre plate to be extended to the stem and stern-post plates, and riveted thereto.

BILGE KEELSONS AND STRINGERS.

Section 17. 1. All vessels to have bilge keelsons fitted and riveted to double reversed angle irons to each floor, secured in an efficient manner, and to extend all fore and aft, and placed at the lower turn of the bilges according to the form of the bottom ; to be formed of double angle irons of the size given in Table H, with bulb plate not less than the size given for hold beams fitted between them for one-half the length of the vessel in midships ; and in addition, in vessels of 300 tons and under 700 tons, a stringer will be required between the bilge keelson and hold beams, formed of double angle irons back to back, well riveted to double reversed angle irons and to each other ; at the fore and aft ends of the vessel the bilge keelson and stringer angle irons to be efficiently connected by plates forming hooks and crutches, which are to be properly riveted to the apron and inner stern-post plates ; and such vessels to have intercostal plates fitted midway between the main and bilge keelsons, for three-fifths the vessel's length of keel in midships, these plates to be the thickness of the floor-plates, and connected thereto with angle irons of the size of the reversed frames.

2. In vessels of 700 tons and under 1,000 tons, in addition to the foregoing, a bulb plate, not less in thickness than the hold beams, is to be let down and riveted to the side intercostal plates, to be inserted between double angle irons on the top of the floors of the size given for stringer angle irons in Table H, and to be extended for three-fifths the length of the keel in midships, but the double angle irons to extend as far forward and aft as practicable.

3. In vessels of 1,000 tons and upwards, of a depth not requiring orlop beams, in addition to the foregoing, another stringer must be introduced formed of double angle irons fitted back to back to extend fore and aft, and riveted to double reversed angle irons and to each other ; this stringer and the one below it are to be arranged so as to be equally spaced between the bilge keelson and hold beams, and a foundation plate, of the same thickness as the floors, is to be fitted for three-fifths the vessel's length of keel amidships under the bilge keelson, to be riveted to double reversed frames to the floors, and to which the bilge keelson is to be riveted. The breadth of the foundation plate is not to be less than three and a half times the flange of the angle iron fitted upon it.

4. Where bulb iron is used for keelsons or stringers, the joins to be overlapped and riveted ; the length of the overlap must not be less than the depth of the bulb plate, but iron of other form than bulb may be used for them if of equal strength.

5. All angle irons for keelsons and stringers are to be in as long lengths as possible, properly shifted, and wherever butted to be connected with angle iron or plate iron not less than two feet long, fitted in the throat of them, properly riveted to each flange, and the thickness of the connecting plates not to be less than the angle irons they connect.

SPACING OF BEAMS.

Section 18. 1. The spacing of the upper deck beams in no case to exceed 4 feet 6 inches from centre to centre.

2. Vessels of 11 feet depth of hold and under to have a stringer formed of double angle irons back to back, of the size given in Table H, placed midway between the bilge keelson and deck beams, fitted and riveted to reversed angle iron attached to each frame, to extend all fore and aft, and connected by plates at the ends forming hook and crutch, which are to be secured to the apron and inner stern-post.

3. Vessels over 11 and under 13 feet depth of hold to have a hold beam stringer plate of the same thickness as the upper deck stringer plate, but only two-thirds its breadth, efficiently secured to the side by an angle iron riveted to it and to the reversed frames, of the size given in Table H for stringer angle iron, to extend all fore and aft, and to be properly connected at the fore and after ends. Bracket or knee plates to be fitted and riveted to the stringers at alternate frames on the under side, and the inner edge of the stringer plate to be stiffened by an angle iron of the same size as given for the reversed angle iron on the frames; or, if preferred, a stringer may be formed of bulb plate of the size given for hold beams fitted between two stringer angle irons, passing all fore and aft, properly riveted to double reversed angle iron on the frames, and to each other, or a stringer may be introduced of any other form of equal strength.

4. Vessels of 13 feet and under 15 feet depth of hold to have a hold beam under every alternate upper deck beam.

5. Vessels of 15 feet depth of hold and under 18 feet to have hold or lower deck beams spaced not more than 4 feet 6 inches, and 9 feet from centre to centre alternately, and always to be placed under upper deck beams.

6. And, in vessels of 18 feet depth of hold and above, a hold or lower deck beam to be placed under every upper deck beam.

PANTING (TO PREVENT).

7. In vessels exceeding 12 feet in depth from the lower side of the lower deck beams, and having fine ends, extra beams will be required both forward and aft between the lower deck beams and floors to prevent "panting," the sizes, arrangement, and security of them to be to the satisfaction of the Surveyors.

TWO-DECKED VESSELS WITH ORLOP BEAMS.

8. All two-decked vessels exceeding 24 feet in depth from the top of the floors to the upper side of the upper deck beams, and three-decked vessels exceeding 24 feet to the upper side of the middle deck beams, and where the depth from the under side of the lower deck beams exceeds 15 feet, such vessels to have orlop beams under every second lower deck beam with a stringer plate on their ends, of the same breadth and thickness as the lower deck stringer, passing all fore and aft, supported by brackets riveted to every other frame between the beams; the orlop beams to be secured to lugs welded to the lower deck beam pillars; but, in the case of flush-deck ships, a depth of 25 feet will be allowed, provided the lower hold does not exceed 16 feet in depth from the under side of lower deck beams. Should a house be constructed on such flush-deck ship, for lodging crew or for store room, the same not to extend within 10 feet of the stern-post,

THREE-DECKED VESSELS.

9. In vessels having three decks, viz., upper, middle, and lower, and where cargo may be carried on the middle and lower decks, the beams, iron sheerstrake, upper deck stringers, and stringer angle irons and flat of upper deck are to bear the same proportion to the vessel's dimensions as in those having two decks, and the middle and lower deck beams, and stringers, are to be the same size, in proportion to the vessel's length and breadth, as they would be in the lower deck of a vessel having only two decks; but one-sixth reduction will be allowed in the thickness of the outside planking for one-fifth of the depth of hold below the upper deck stringer.

10. In all cases the middle deck is to be perfectly laid, and caulked.

BEAMS.

Section 19. 1. Beams to be of bulb plate with double angle irons on the top edge, or of T bulb iron, or of any other approved form of equal strength.

2. The upper deck beams to be one quarter of an inch in depth to every foot in length of the midship beam, and to be in thickness one-sixteenth of an inch for every inch in depth, with one-sixteenth of an inch added; if of T bulb, the united breadth of the top flanges to be not less than three-fourths the depth of the beam, and where beams are formed of bulb plate with double angle irons on the top edge, the flanges of each of the angle irons are not to be less in their united breadth than three-fourths the depth of the beam, and to be one-sixteenth of an inch in thickness for every inch of the two sides of the angle iron.

MIDDLE-DECK, HOLD, AND ORLOP BEAMS.

3. Middle-deck, hold, and orlop beams to be one-eighth of the depth deeper, and one-sixteenth of an inch thicker than the upper deck beams.

4. All beams to be efficiently connected to the frames by bracket ends, or knee plates, the arms of each to be not less than twice and a half the depth of the beams in length, and of not less thickness than the beams.

PILLARS.

Section 20. All beams for at least three-quarters the length of the vessel in midships to be pillared, and in addition, the beams under the bowsprit, pall bitt, windlass, and capstan are to be pillared; the pillars to have not less than two rivets in each of their ends, so as to form a continuous tie from the keelson to the upper deck, or spar deck, and to be of the sizes given in Table H.

ENGINE ROOM AND BOILER SPACE.

Section 21. In the construction of steam vessels, care must be taken that the engine and boiler bearers are properly constructed, and where they might interfere with the longitudinal strength of the vessel they must be extended a sufficient distance beyond the engine and boiler space to compensate for such interruption; and, after the machinery and boilers are fitted, as many hold or lower deck beams are to be introduced as may be practicable, and knee or bracket plates are to be added and riveted to the stringer plates and to alternate frames which have no beams in the said space, and the vessel is to be otherwise made secure where necessary in the engine room, to the satisfaction of the Surveyors.

RAISED QUARTER-DECKS.

Section 22. 1. The frames in all cases, and reversed angle iron on alternate frames, where practicable, are to extend to the raised quarter-deck stringer.

2. A reduction of one-half in the breadth and one fifth in the thickness will be allowed for the sheerstrake of the raised quarter-deck, and one-fifth in the scantlings of the beams, stringers, stringer angle iron, and flat of deck of raised quarter-deck, from that given in Table H for the upper deck of such ships; one-fifth reduction will also be allowed for the outside planking, or plating, of the raised quarter-deck from that given for topsides in Table H.

3. The upper deck beam stringer plate is to maintain its breadth to the break of the quarter-deck, and then it may be gradually reduced in breadth until it terminates at the sixth frame abaft the break, and the upper deck sheerstrake plate is to extend to the stern.

POOPS AND FORECASTLES.

Section 23. 1. In full poops and top-gallant forecastles, the frames are to be extended to their stringer plates; a reduction of one-fourth will be allowed from the dimensions required by Table H for the upper deck sheerstrake, stringer plate, angle iron on stringers, beams, and flat of deck; the same reduction will be allowed for the outside planking, or plating, of the poop or forecastle, from the thickness given for topsides in Table H; where plating alone is adopted it need not in any case exceed six-sixteenths of an inch in thickness, and may be single riveted. An iron or wood spirketting to be fitted and efficiently secured and caulked in the poop and forecastle, to prevent water from going into the 'tween decks. The united lengths of poop and forecastles not to exceed three-fifths of the entire length of the upper deck.

2. Where the poop or the forecastle is constructed of a rounded form at the gunwale, the frames need not extend beyond the lower part of the curve, and the beams may be of plain angle iron not less in dimensions than the size required in Table H for the main frames, one to be placed to every alternate frame, to scarph the main frames with not less than two-feet lengths and be properly riveted to them; the breast beams are not to be less in size than the angle iron for stringers prescribed in Table H, with an angle iron of the size of the reversed frames riveted to them, and the rounded gunwale when not intended to be planked over, its plating must be of the thickness required for sheerstrakes of poops; but, when intended to be planked over, the thickness prescribed for the stringer plates on beams of poops will be sufficient; in either case the plating must extend the breadth of the rounded form, and in such cases stringers on beam ends will not be required.

TONNAGE, HAVING REFERENCE TO SCANTLINGS, &c.

3. In flush-decked vessels having either one, two, or three decks (not being spar or awning decked) the tonnage under the upper deck, *without abatement of the tonnage of the space for the crew, or for the propelling power of steam vessels*, is to regulate all the scantlings of the hull and also the equipment of the vessel.

4. In vessels having a *raised quarter-deck*, or a poop, or top-gallant forecastle, or deck houses, or awning deck, or spar deck, the total tonnage below the tonnage deck is to regulate the scantlings of the hull; but the register tonnage, as cut on the main beam of sailing vessels and of steam vessels, *with the*

addition of the tonnage of the space required for propelling power, is to regulate the equipment, and also the size of the main piece of rudder and windlass, and the keel and keelsons and their number, and the scantling of the stringer plates on the upper and lower deck beams, and the requirements as to double riveting.

5. But, in vessels where the tonnage of the erections above the tonnage deck is less than that required for crew space, *then the difference* between the tonnage of these erections and the tonnage of the space allowed for crew is to be added to the register tonnage cut on the main beam, for the tonnage that is to regulate the equipment and the size of the main piece of rudder and windlass, and the keel and keelsons and their number, the scantling of the stringer plates on the upper and lower deck beams, and the requirements for double riveting.

SPAR-DECKED VESSELS.

Section 24. 1. A spar-decked vessel is one having three decks or tiers of beams, where the space between the main and the spar deck is to be used only for the accommodation of crew and passengers, or to enclose the engine openings of steam vessels. The total depth of such vessels, measured from the top of floor-plates to the top of spar deck beams in midships, must not exceed thirteen-sixteenths, nor be less than twelve-sixteenths of the ship's extreme breadth. All frames and reverse angle irons on alternate frames are to extend to the spar deck stringer plate, except when constructed with a rounded form at the gunwale, then they may terminate at the lower part of the curve, but the reverse angle irons on the remaining frames are required to extend above the height of the main deck waterway or spirketting; in such ships the gross tonnage below the main or tonnage deck is to regulate all scantlings below this deck, but the total tonnage is to regulate the scantlings of the keelsons and their number, the stringers in the hold, the size of the main piece of rudder, and windlass.

2. These vessels are to have a main or middle complete deck, perfectly laid and caulked, and a main or middle deck iron sheerstrake, each of the thickness prescribed by Table H, and the main deck stringer plate is to be fitted and connected to the iron sheerstrake by angle iron between the frames of the size given for stringers, and in addition an inner stringer angle iron passing continuously fore and aft must be riveted to the reversed frames and to the main deck stringer plate. The upper part of the sheerstrake is to be not less in height than the main deck waterway or spirketting, as the case may be, and the space between the waterway, or spirketting, and the sheerstrake, all fore and aft, is to be filled in and made water-tight.

3. In such vessels a reduction of one-fourth from the dimensions required by Table H for the corresponding parts in the range of the upper deck in ships with two decks will be allowed from the dimensions of all beams, stringers, thickness of deck, and the outside planking, or plating, from the main deck upwards. If plating alone be adopted between the main and spar decks, the thickness need not exceed six-sixteenths of an inch in any case, the butts to be *double* riveted, but the edges may be single riveted.

4. When the spar deck is constructed of a rounded form at the gunwale, the beams may be of plain angle iron, if fitted to alternate frames, not less in dimensions than the sizes required in Table H for the main frames, to scarp the main frames with not less than two-feet lengths, and be properly riveted to them. All hatchway and mast beams are to be of increased strength, and if of plain angle iron not to

be less than the sizes given for stringer angle irons in Table H, with other angle irons of the size of the reversed frames riveted to them back to back. The rounded gunwale to be plated and properly constructed to the satisfaction of the Surveyor.

5. Deck houses or other erections will be allowed on a spar deck, but only to the extent of one-tenth its total superficial area ; they are not to exceed seven feet in height, nor be placed nearer to either end of the vessel than one-fifth of her extreme length.

6. Vessels to which the Rule applies as regards an entire spar deck, will be noted in the Register Book thus, "*Spar-deck.*"

IRON SHEERSTRAKE.

Section 25. 1. The iron sheerstrake to be one inch in breadth for every six feet of the vessel's length for half her length in midships, and to be of the thickness given in Table H ; it may then be gradually reduced in breadth and in thickness to three-fourths of the midship breadth and thickness at her ends.

2. The butts of the iron sheerstrake in all cases to be shifted clear of the butts of the stringer plates on the beam ends, the shift in no case to be less than equal to three spaces of frames, and all plates where practicable to be not less than nine feet long, but if the sheerstrake plates are eighteen feet long they may be of two equal breadths, but carvel plated and single riveted ; butts of all plating to be fitted quite close, and in no case is the lower edge of the iron sheerstrake to be fitted less than two-thirds of the breadth required by the Rule for sheerstrake, below the upper deck stringer plate. The butt-straps in all cases to be in one piece, whether fitted outside or inside, and in no case to be in two pieces by being cut at the stringer plate. (*See Section 30.*)

IRON BILGESTRAKE.

Section 26. The bilgestrake plates to be two-thirds the breadth of the iron sheerstrake, for three-fifths the length of the keel in midships, and from thence to the ends of the vessel they are to be reduced gradually to one-half their midship breadth ; the thickness of the plates to be as prescribed in Table H, and they are to be fitted at the bilges with the middle of the plate at the height prescribed for floorheads, such position for the bilge plates to be maintained, notwithstanding that the floorheads may be carried higher. They are to be extended to the ends of the vessel in accordance with her form, and properly riveted to the frames.

DIAGONAL PLATES ON FRAMES.

Section 27. The diagonal plates on the frames to be not less than one-third the breadth of the iron sheerstrake, and fitted in pairs, transversely, all fore and aft, at an angle of 45° , with the butts of each pair meeting between the frames ; to be of the thickness given in Table H, and connected to the sheer and bilgestrake plates by butt-straps, double riveted, and to be efficiently riveted to each other, and to each frame they cross.

STRINGER PLATES ON ENDS OF BEAMS.

Section 28. 1. All vessels to have stringer plates of the thickness given in Table H upon the ends of each tier of beams. Those upon the ends of the upper deck beams of one, two, and three-decked vessels, to be in width one inch for every seven feet of the vessel's entire length, for half her length in midships and from thence to the ends of the vessel they may be gradually reduced to three-fourths the width

in midships ; in no case, however, is the width in midships to be less than eighteen inches. The stringer plates are to be riveted to the beams and properly shifted, fitted home, and riveted to the iron sheerstrake with an angle iron of the dimensions given in Table H, and the roughtree stanchions are not to pass through them. Stringer plates on the ends of beams below the upper deck may be reduced in width to three-fourths the midship breadth of the upper deck stringer, which breadth is to extend all fore and aft, and to have an angle iron of the dimensions given in Table H, extending all fore and aft, riveted to reverse angle iron on each frame and to the stringer plates.

2. In cases where a deck is not laid, and the width of the stringer plate on ends of hold beams is objected to, it may be reduced in width, provided such reduction be fully compensated for.

3. All stringer angle irons are to be in as long lengths as possible, properly shifted, and wherever butted to be connected with angle iron, or plate iron, not less than two feet long, fitted in the throat of them, properly riveted to each flange, and the thickness of the connecting plates not to be less than that of the angle iron they cover.

GUTTER WATERWAYS.

4. Upper deck gutter waterways are to be flooded to ascertain if there be any leakage, and when completed they are to be properly cemented.

TIE-PLATES.

Section 29. 1. All vessels are to have tie-plates ranging all fore and aft upon each side of the hatchways on each tier of beams, and in addition thereto the beams of the upper and middle decks in three-decked or spar-decked vessels, and of the upper deck in vessels of one or two decks, must have tie-plates fitted from side to side diagonally, in number, one pair for about every thirty-five feet of the vessel's length ; these plates in both cases must not be less in width than once and a half the depth of the beams of their respective decks, and of the thickness required for stringer plates ; they are to be well riveted to each other and to the beams and stringers, and to have intermediate fastenings into the deck plank between the beams. In all cases their butts to be chain riveted.

2. Upon hold beams where a deck is not to be laid, a tie formed of double angle iron, of the size given for the main frames of the ship, may be fitted each side of the hatchways in lieu of tie-plates ; but, if the beams are made of such additional strength laterally as not to require the support given by the said angle irons or tie-plates, double angle irons of the above size fitted at the centre line from opening to opening may be substituted.

HATCHWAYS AND MAST PARTNERS.

3. All hatchways and mast holes are to be properly framed to receive half beams where required, and the latter to have mast partners at each tier of beams (except at orlop beams), the plating of which is not to be less in thickness than is required for stringer plates, and the united breadths of the plates are not to be less than three times the diameter of the masts ; these plates are to be well riveted to each other, and to the beams, and angle iron carlings ; and at the decks, where the masts are to be wedged, an angle iron of the dimensions required for the main frame of the ship is to be properly fitted and riveted to the piate round the mast holes. The mast holes, skylights and companions must be properly secured to the satisfaction of the Surveyors. Where wood coamings are fitted, plates are to be riveted to the beams to which the deck ends are to be fastened.

SKYLIGHTS.

4. The skylights to engine-rooms, and the coamings to which they are attached, are in all cases to be substantially constructed, and efficiently fastened to the beams, and whether of iron or wood, are not to be less than two feet six inches above the upper deck in one or two-decked vessels, and one foot six inches above spar or awning decks. The skylights to be securely attached to the coamings, and the glass in them should be very strong, from three-eights to half an inch thick, protected by a strong guard of iron rods or by a framework of wire; in addition, deadlights of either iron or wood should be fitted having bulls-eyes in them, and arrangements made for their efficient security in bad weather. Strong tarpaulin covers are in all cases to be provided. In spar-decked vessels, and those having either a poop, awning deck or bridge house, with the engine room beneath, the hatchways in the upper deck are to be enclosed by iron trunk bulkheads, not less than five-sixteenths of an inch thick, strengthened by angle iron and extended from the upper deck to the beams above, to which they are to be secured. Strong iron doors will be allowed in these trunk bulkheads, provided their lower parts are at least eighteen inches above the upper deck, and arrangements made for their efficient security.

COAL BUNKERS.

5. Coal bunker pipes, where practicable, are to be formed so as to be at least six inches above the upper deck, fitted with gratings and lids, the latter to have studs to fit in openings made in the pipes for their security, the pipes to be so formed that tarpaulin may be securely lashed over them. Where it is necessary to fit flat cold bunker scuttle lids flush with the deck, they must be secured by a bar, or other approved fastening.

BUTT-STRAPS.

Section 30. Butt-straps in all cases, except those of floor-plates (*see* Section 13), to be one-sixteenth of an inch thicker than the plates they connect, and to be fitted with the fibre of the iron in the same direction as that of the plates, and riveted as per Section 4.

BUTT-PLATES OF OUTSIDE PLANKING.

Section 31. The plates to which the butts of the outside planking are to be secured must be of the breadth of the planks, extending from frame to frame, efficiently riveted thereto, and of the thickness given in Table H; but on the bows and quarters, or wherever else the plank ends may have a tendency to strain off, they are to be one-eighth of an inch thicker than therein prescribed.

PLANKING.

Section 32. 1. The material for planking to be in accordance with class in Table I, to be thoroughly seasoned, quite free from sap, wane, or other defects, to be wrought with the heart side to the frames, and with not less than three strakes between the butts, without step butting, and with not less than six-feet shifts; the garboard strakes to be shifted, and of the thickness given in Section 7; the bottom planking is not to be less in thickness than prescribed in Table H, from the garboard strakes up to within

a fifth of the depth of hold set down below the upper deck stringer plate ; from thence to the plank-sheer to be in thickness as prescribed in Table H for topsides ; or, if preferred, the bottom planking may retain its thickness up to within a fourth of the depth of hold set down below the upper deck stringer plate, and from thence to the plank-sheer be gradually diminished in thickness to that prescribed in Table H for topsides ; the thickness of the wood sheerstrakes may be the thickness of the iron sheerstrake they cover less than that prescribed by Table H.

2. Outside planks (except the garboard strakes) are not to be more than twelve inches broad ; they are to be fitted quite close to the frames and plates, and to each other at their inner edges, and wrought with proper seams outside in proportion to their thickness ; the hood ends may be reduced one-fifth from the thickness given in Table H at the stem or stern-post, and one-third at the buttock. The caulking edge of the keel seam, and hood end seams of the planking at the stem and stern-post, need not exceed from two and a half inches to four inches in proportion to the tonnage of the vessel ; which can be arranged by trimming the back rabbet from the bearding line to the rabbet line, as required, so as not to unnecessarily reduce the keel, stem, and stern-post. Furrrens or pads are in no case to be used.

BOLTS.

Section 33. 1. The bolts to be not less than the sizes given in Table K ; the garboard strakes to be cross-bolted from side to side, with bolts not exceeding four feet six inches apart.

2. The wood keel to have a vertical bolt through the keel plate between each frame. The stem, stern-post, deadwood, and remainder of the keel, to be through fastened in all cases, and the bolts spaced as in the keel.

3. The screw-pointed bolts for fastening the planking, when less than five inches thick, to be of such form under the heads as will prevent them from turning ; their heads to be once and three-quarters the diameter of the bolts, and two-fifths their diameter in thickness ; the nuts in all cases to be of the same description of metal as the bolts they are applied to, and to be in thickness equal to their diameter, and not to have less substance than three-eighths of the diameter of the bolts in any part, whatever the form may be, hexagon form being preferred.

4. All outside planks ten inches broad and above, to be double fastened ; eight inches and a half and under ten inches, double and single fastened alternately ; and under eight and a half inches single fastened ; and all butts to be double fastened.

5. The bolt holes in the outside planking to be enlarged with a dowelling machine for the bolt heads, which in the bottom up to within one fifth the depth of hold set down below the upper deck stringer plate, are to be sunk within the surface of the planking one inch and a quarter, when dowels are intended to be used ; from thence to the plank-sheer they need not be sunk more than three-quarters of an inch ; the bolts to be properly driven with oakum and white lead, putty, marine glue, or other suitable composition under their heads, and in the bottom they are to be carefully covered (after the seams in the bottom are all caulked) with turned well-seasoned wood dowels, the fibre of which must be in the same direction as the planking, and be driven with white lead, marine glue, or any other approved composition. Where copper or yellow metal bolts are used, the sinking of them within the surface of the planking to be optional to the above extent.

PLANKING OF TWO THICKNESSES.

Section 34. 1. If the vessel is to be planked with two thicknesses, the whole of the inside thickness must be of material required by Table I, for the upper part of the vessel, and the outside thickness, if worked longitudinally, must be of the same material as is prescribed for a vessel constructed with a single thickness of planking, but if the outside thickness is to be worked diagonally, American Rock Elm may be used. If either or both thicknesses be worked longitudinally, or diagonally, each thickness need only be one-half that prescribed in Table H, but thick garboard strakes will be required to be fitted and fastened as in the case of vessels with a single thickness of planking. When the outside thickness is worked diagonally, a longitudinal stave of plank must be rabbeted into the garboard stave, and the ends of the diagonal planks butted against it ; there must also be one or more longitudinal staves of plank of the materials prescribed in Table I for the upper part of the vessel, fitted above the upper ends of the diagonal planking ; and, if the topsides be of a single thickness, the upper edge of the said longitudinal planking must be partly let into the topside plank or be rabbeted into a solid stave, so that it may be efficiently caulked. In all such cases both thicknesses must be caulked, and the outer thickness wrought hot on the *best hair felt*.

2. If both thicknesses of plank be worked diagonally, transversely to each other, from keel to gunwale, the bilge and diagonal plates may be dispensed with ; but, where the thicknesses are otherwise arranged, the bilge and diagonal plates must be fitted as in vessels with single thickness ; the diagonal plates may, however, be extended to ten feet apart on a square with three pairs crossing each other in the centre.

3. When the inner thickness of plank is wrought diagonally, all the planks must be double fastened to the frames, but, when wrought longitudinally, they may be fastened as per Section 33, the bolts in either case must be of the size prescribed in Table K. The outer thickness of plank must be secured to the inner by nut and screw bolts, or else by wrought copper bolts, driven through the inner thickness and clenched inside upon copper or yellow metal rings ; a reduction of one-fifth of the diameter from that prescribed in Table K will be allowed when nut and screw bolts are used for fastening the outer thickness of plank, and a reduction of one-third when it is intended to use wrought copper and to clinch the bolts of this thickness

4. In vessels claiming the additional period for copper or yellow metal bolts, the fastenings in both thicknesses must be of the description and to the height required in those having only one thickness. Where two thicknesses of planking are adopted, dowelling will not be allowed in either thickness.

5. When the planking is composed of two thicknesses, the outside thickness of planking should not exceed ten inches in breadth, and may be single fastened, but the fastenings are not to exceed twenty inches apart on an edge ; if, however, planks are used in the lower part of the bottom more than ten inches but not exceeding twelve inches in breadth, their fastenings are not to exceed eighteen inches apart on an edge.

6. All iron work, and all iron and wood surfaces which come in contact with each other, are to be properly coated with good paint, or other suitable composition.

CAULKING.

Section 35. 1. It is indispensable that the caulking should be well executed, and no material used, but the best brown oakum, with tarred spun yarn for the inner thread of bottom. The Surveyors are required to see the caulking thoroughly tested with a beetle and horse, especially in new vessels, and at all surveys when the sheathing is stripped off the bottom.

2. In vessels with two thicknesses of planking, the condition of the caulking of the outside thickness is to be ascertained, in new vessels, by having a few pieces cut out from the bottom planking so as to expose the oakum; but it will not be necessary to have pieces cut out in vessels with single bottoms, as it can be ascertained whether the oakum is properly driven into the seams by inserting a thin knife into them from within the vessel.

KNIGHTHEADS, HAWSE TIMBERS, UPPER-DECK WATERWAYS, AND PLANKSHEER.

Section 36. 1. Where the knighthheads, hawse timbers, upper-deck waterways, and plank-sheer are of wood, they must be of materials according to class in Table I, and fastened with bolts as in Table K.

2. The knighthheads and hawse timbers are to be of sufficient siding and moulding, and to have boxing either outside or inside above the upper deck; they are to extend high enough for the efficient security of the bowsprit, and sufficiently below the upper deck to insure strength; to be well bolted, and connected by substantial hooks.

WATERWAYS.

3. Where the roghtree stanchions are of wood, the depth and moulding of the upper deck waterway must be sufficient to give them support; but the depth of the waterway is in no case to be less than three times the thickness of the upper deck, excepting where the planksheer covers it, and it will be required to be well bolted through the sheerstrakes or spirketting plate and upper deck stringer plate.

DECKS.

Section 37. 1. The flat of all decks to be of good quality, properly seasoned, free from sap and objectionable knots, the thickness and fastenings as per Table H.

DECK BOLTS.

2. The upper deck plank to be fastened by screw bolts from the upper side with nuts at the under side of the angle iron of the beams, and to the tie-plates (*see* Section 29). The bolts must be properly sunk with oakum and white lead under their heads, and be carefully covered over with turned dowels, with the fibre in the same direction as the deck plank, bedded in white lead, marine glue, or other suitable composition.

3. When the deck planks are six inches in width and under, single fastening will be sufficient; but when they are above six inches and not exceeding eight inches in width, there must be two bolts in each plank in every beam, one of which may be a short screw bolt; and planks exceeding eight inches in width must be double fastened with nut and screw bolts.

4. If the deck is of teak, it may be one-eighth less in thickness than prescribed in Table H.

5. When a deck originally required to be 4 inches thick is worn to 3 inches; $3\frac{1}{2}$ inches to $2\frac{3}{4}$ inches; 3 inches to $2\frac{1}{2}$ inches, it must be renewed, unless it be found on survey to be in good condition, when on application the case will receive the consideration of the Committee.

CEILING.

Section 38. All vessels to be closely ceiled from the main keelson to the upper part of the bilges, the ceiling to be secured in such a manner as to be easily removed, and from the upper part of the bilges upwards, either close ceiling or batten and space may be adopted, but the latter is considered preferable.

It is recommended that the ceiling on the floors should be made in hatches, where practicable, of convenient sizes so as to be lifted when required for the purpose of survey, or for cleaning and painting. The thickness of the ceiling in the hold from the main keelson to the upper part of the bilges to be in accordance with Table H, and one-third less in thickness from thence upwards.

RUDDER.

Section 39. 1. The main piece of rudder to be of timber, according to class in Table I, of dimensions as per Table H, and the pintles as per Table K. In screw steamers, the size of the main piece of rudder must be increased in diameter not less than one-eighth above the dimensions given in Table H and the pintles and braces in the same proportion.

RUDDER BRACES.

2. The lower rudder brace is to extend on the bottom planking sufficiently to receive not less than three bolts before the hood ends in addition to the bolts in the stern-posts; the remaining braces will not be required to pass the hood ends, but the ends of their arms should be made **H** shaped, or of other suitable form, so as to receive three through bolts in the stern-post.

HAND PUMPS.

3. All hand pumps to be capable of being worked from the upper or main decks above the deep Load Water Line, the bottom of the pump chambers are not to be more than 24 feet above the suction rose, and the pumps are to be tested by the Surveyors to ensure that the water can be pumped from the limbers. The sizes of the hand pumps to be not less than those given in the following Table:—

Tonnage under Upper Deck.	Hand Pumps in Holds.	
	Diameter of Barrel. Inches.	Diameter of Tail Pipe. Inches.
In vessels under 500 tons...	4	2
In vessels of 500 tons but under 1,000 tons	4½	2½
In vessels of 1,000 tons but under 2,000 tons	5	2½
In vessels of 2,000 tons and above	5½	2¾

In lieu of hand pumps in each compartment an approved fly wheel pump may be fitted if it is connected to the steam pump bilge suction pipes of these compartments.

CHAIN PLATE AND PREVENTER BOLTS.

Section 40. The chain plate and preventer bolts to be of the sizes given in Table K. When the chain and preventer plates are fitted on wood topsides, and the chain and preventer bolts are arranged to pass through below the iron sheerstrake, a plate is to be riveted to the frames, before working the wood topsides, of the same thickness as the sheerstrake, sufficiently wide to take the said bolts, and fillings of wood may be introduced between the frames for the bolts to pass through and be clenched upon plates, or otherwise secured to the satisfaction of the Surveyors.

CEMENT.

Section 41. All vessels to be efficiently cemented in the bottom, to the upper part of the bilge, care to be taken to have proper watercourses above the cement all fore and aft.

Section 42. 1. The Surveyors in their reports of vessels for original classification, which have partial deficiencies in either the workmanship, materials, or construction, are to state the same for the consideration of the Committee, when such vessels will be liable to have a reduced number of years assigned to them than they would otherwise have been entitled to.

2. *The Surveyors in submitting their reports of vessels not already classed, are in all cases, where practicable, to forward a sketch of the midship section, and other drawings where necessary, to be furnished by the builders, with figured dimensions of the component parts marked thereon.*

3. *Builders wishing to adopt plans other than those described herein, are to submit them in the usual manner through the Resident Surveyors (who are to state their opinions thereon) for the Committee's consideration and approval.*

PERIODICAL SURVEYS DURING CLASSIFICATION.

***PERIODICAL SURVEYS.** (*See N.B. at foot.*)

Section 43. 1. All vessels to be surveyed annually if practicable; and whenever the copper, yellow metal, wood, or other sheathing, is stripped off, the condition of the planking, fastenings, and caulking to be ascertained.

2. Vessels marked CF to be subject to a Special Survey every *four* years; and those marked GIB and IB to be subject to a Special Survey every *three* years. Such Special Surveys will be noted in the Register Book.

3. When these Special Surveys are held, the vessel to be placed on blocks of a proper height in a dry dock, or upon ways; if she is sheathed with wood, a sufficient quantity must be removed for the examination of the bolts, caulking and planking.

4. At the first Special Survey the limber boards, and ceiling equal to one strake fore and aft on both sides in the hold, below the upper turn of bilge, must be removed.

5. At subsequent Special Surveys, ceiling equal to an additional strake on both sides in the hold, and one strake on both sides in the 'ween decks (provided it is close ceiled), must be removed; portions of the cement to be cut out to ascertain its condition, and that of the frames and keel plate; bolts of the bottom and keel, if of iron, to be got out for examination—the number removed, and their condition, to be stated in the Report of Survey. If the frames, floors, &c., are found to be much oxidized, the whole of the ceiling to be removed and the oxidation cut or beaten off, and the iron work, if necessary, renewed, and the whole then to be properly coated or painted.

6. At the second Special Survey the windlass to be unhung where necessary, and its wood lining sufficiently stripped for examination, and the chain cables ranged for inspection.

7. The hatches are to be examined in position at the hatchways, and, if defective, are to be renewed or made good.

8. The steam steering engine, its connections, the steering rods, chains, blocks, rudder quadrant, tillers and steering gear, to be carefully examined and the condition of the various parts to be stated by the Surveyor on his report of survey.

* In the cases of Steam Vessels, see Rules for the Survey of Engines and Boilers.

N.B.—In reference to the Rules above quoted, and in order to prevent the disappointment arising from ships losing their Characters from want of survey, it is hereby intimated that the duty of giving NOTICE OF PERIODICAL SURVEYS required by the Rules, or when repairs are necessary in consequence of damage, or from other causes, rests with the Owners, Masters, or Agents.

VESSELS NOT SURVEYED WHILE BUILDING.

Section 44. 1. Vessels built in Great Britain, or the British North American Colonies, which have not been surveyed while building, will lose one year of the period to which they might otherwise have been entitled.

2. When a character is claimed for such a vessel, she must be placed on high blocks in a dry dock, or on a slip, or other convenient place, so that the keel and bottom may be seen and properly examined. The hold must be cleared, and proper stages made, the outside planking scraped bright from the light watermark to the waterway seam, a sufficient number of fastenings removed from the keel, the planking of the flat of bottom, the bilges, between the light and load-line, and from the topsides, in order that their condition may be thoroughly ascertained.

3. Should the vessel be less than four years old from the date of launching, if close ceiled, a quantity of ceiling equal to one strake fore and aft on each side in the 'tween decks, a like quantity at the upper turn of bilge, and one plank at the lower turn of the bilge on each side over the floors in midships, will be required to be removed, and the limber boards lifted; but should the vessel exceed four years of age, unless she be found in a very clean and satisfactory condition, the whole of the ceiling, or such portion as the Surveyors may require, must be removed, excepting in the case of "batten and space ceiling."

WOODEN FLOORS, &c.

4. Should the vessel, however, have been constructed with wooden floors, or with iron and wooden frames, and with through fastenings, passing through the ceiling, and she be under four years of age, it will be sufficient if, in lieu of removing the ceiling as above described, a listing be cut out fore and aft on both sides in the 'tween decks 4 inches wide, a ceiling plank at the upper turn of the bilge and at the lower turn of bilge on each side over the floors to be taken out, and the limber boards lifted; but if she exceed four years of age, in addition to the above, a 4-inch listing must be extended fore and aft at the turn of the bilge on each side; and at other parts if considered necessary by the Surveyors.

5. When the foregoing preparations have been made, a careful survey must be held by two Surveyors (one of them to be an exclusive officer of the Society), who shall submit a report and midship section containing a full description of the vessel, comparing the same with the Rules.

6. Should a vessel submitted for classification be sheathed with wood or metal, the same will not be required to be stripped off (if all be found satisfactory to the Surveyors) beyond a sufficient quantity at the keel, hood ends, bilges, and between the light and load water lines, for the purpose of ascertaining the condition of the caulking and the fastenings.

CONTINUATION OF SHIPS ON THE A CHARACTER.*

Section 45. 1. If, on the expiration of the term of years originally assigned, or at any age of a vessel, the owner be desirous to have his ship remain or be replaced on the letter A, such continuation will be granted for a period not exceeding two-thirds the number of years assigned originally, provided that a Special Survey as hereafter described be held by two Surveyors, one of them to be an exclusive officer of the Society, and that all repairs found necessary be completed to their satisfaction. The number of years assigned on continuation to commence from the date of the completion of such repairs.

* Where composite vessels are not constructed in accordance with the Committee's printed suggestions, and a deviation is required from a strict compliance with the Rules, special application must be made to the Committee.

2. The ship must be placed in dry dock or laid on blocks upon ways, so that the keel and bottom may be examined.
3. All sheathing (wood and metal) to be entirely stripped off the bottom and elsewhere.
4. The hold to be cleared, and proper stages made both inside and outside.
5. All the outside planking from the light water-mark upwards, including plankshears and waterways to be scraped or dubbed bright.
6. All the close ceiling, where the frames and floors are of iron, to be removed from the upper part of the bilges downwards, and, where close ceiling is fitted above this height, two strakes of ceiling are in addition to be removed between decks, and two strakes in the hold all fore and aft, when, should the condition of the frames and planking render it, in the opinion of the Surveyors, necessary, the whole of the close ceiling is to be removed.
7. The planking of one strake extending from amidships forward on one side, and from amidships aft on the other side, to be removed to expose the bilge plate, diagonal plates, and the backs of the frames.
8. Not less than twelve bolts on each side, whether of iron or yellow metal, to be driven out in ships of 500 tons and under, and increased in number in proportion to the size of the ship; also cement to be removed in places, for the purpose of ascertaining the condition of the floors, frames, iron keel-plate, butt straps to outside planking, &c.
9. Where the middle line bolts are of iron, their condition is to be ascertained; but, if this be not practicable, additional intermediate bolts of copper or yellow metal must be driven through and clenched.
10. The windlass to be unhung, and its wood lining sufficiently stripped for examination; the hatches are to be examined in position at the hatchways, and, if defective, are to be renewed or made good; the steam steering engine, its connections, the steering rods, chains, blocks, rudder quadrant, tillers, and steering gear to be carefully examined and the condition of the various parts to be stated by the Surveyor on his report of survey; in sailing vessels the standing rigging should be lifted and the service and parcelling stripped off the nips, bends, and splices for examination, unless the rigging has been recently lifted, when particulars of the case should be submitted for the consideration of the Committee.
11. The cables to be ranged, and the anchors and general equipment examined. When any length of a chain cable is worn so that the sectional area at its most worn part is reduced by one-fifth from the original area, it should be renewed. The coal bunkers in steamers to be cleared, and all iron-work to be scraped clean.
12. *The annual and special periodical surveys to apply to vessels so continued as required by Section 43 for ships on original class.*

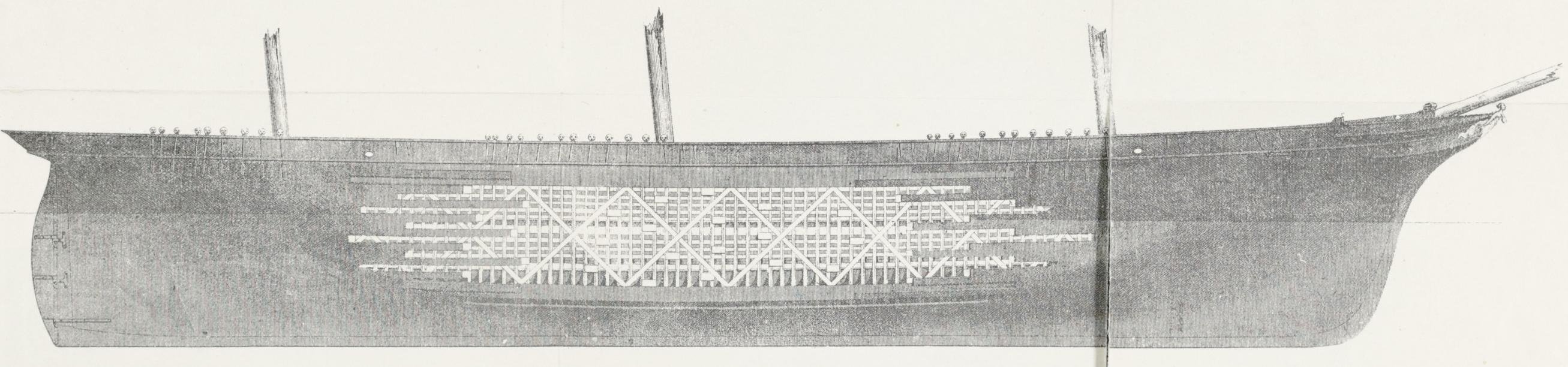
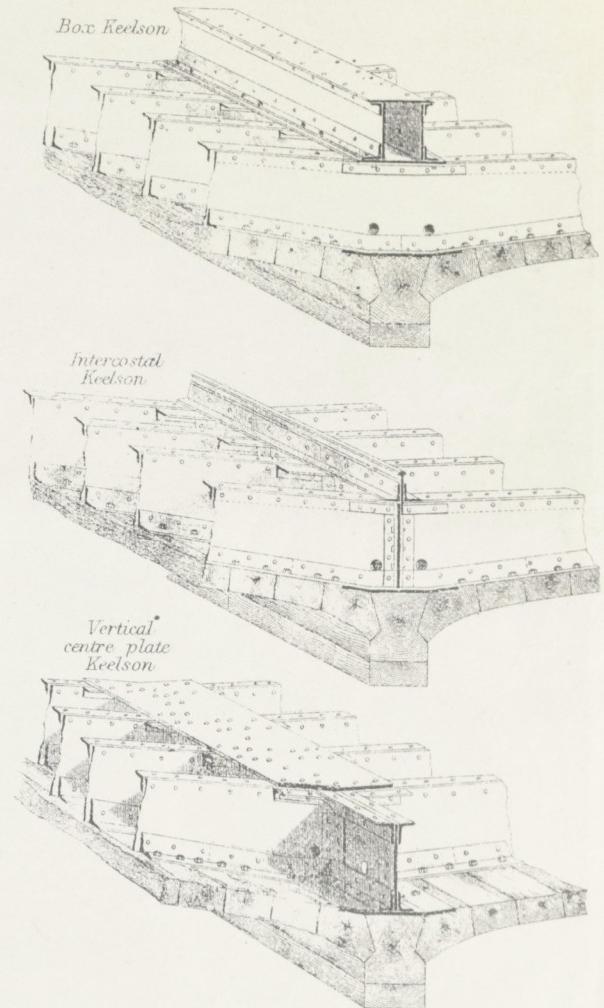
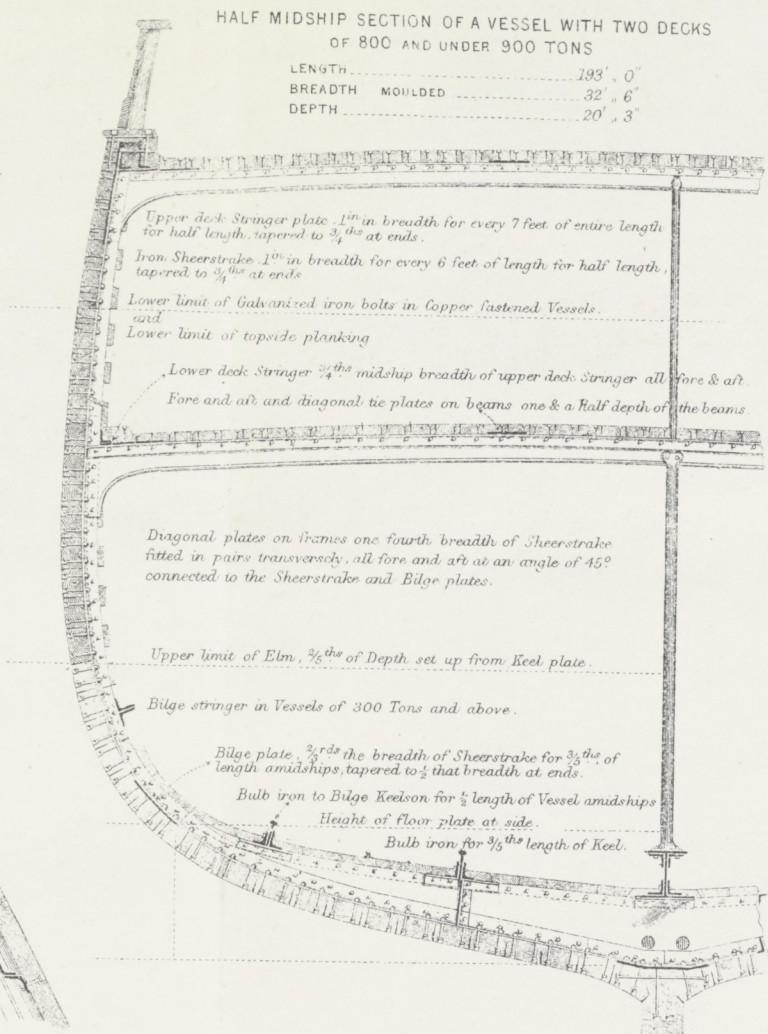
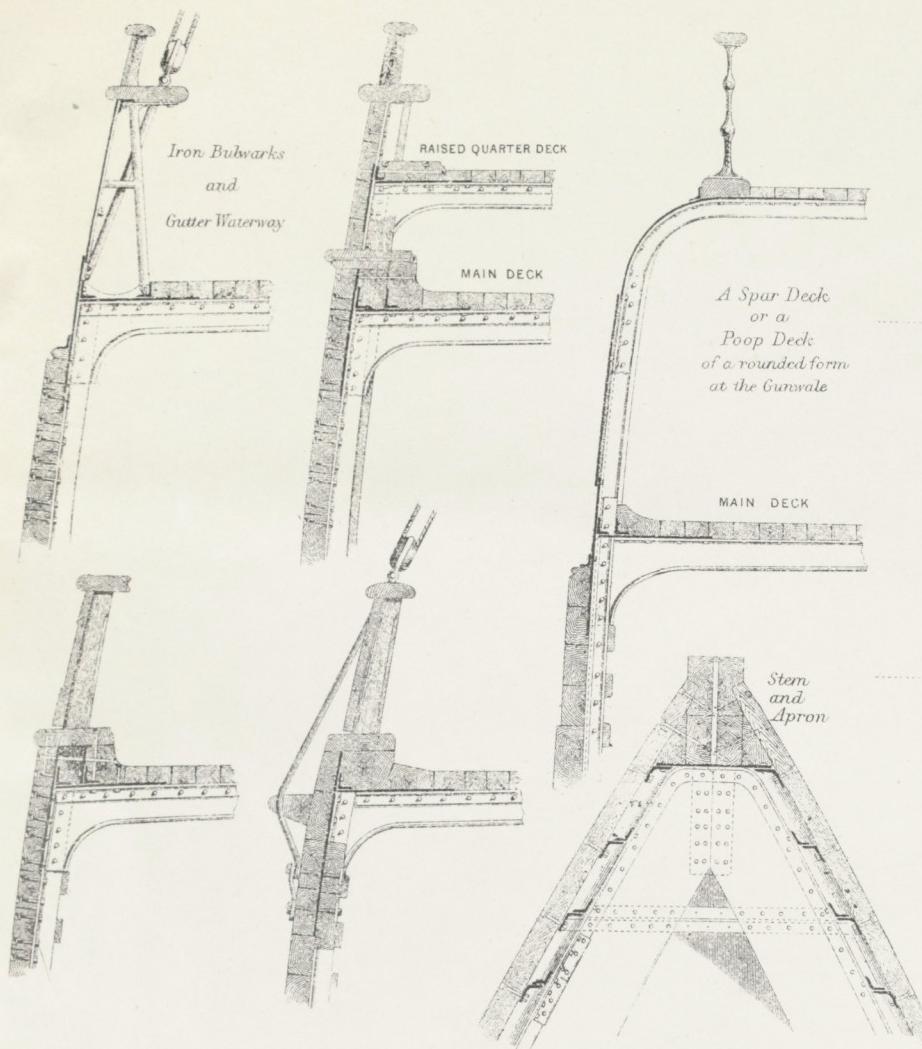
EQUIPMENT.

- Section 46.** 1. The tonnage, as per Section 32 of Rules for Wood Ships, is to regulate the equipment. (*See Sections 72 to 76 of the Rules for Wood Ships, also Table Nos. 30 and 31.*)
2. The efficient state and condition of the whole of the ship's equipment will be designated by the Figure 1; and where the same is found insufficient in quantity or defective in quality, by a dash thus — following the character assigned to the ship. In cases where the Figure 1 is expunged on account of deficiencies in the anchors or chains, the record of L.A.&C.P. or A.&C.P. will also be expunged.

LLOYD'S REGISTER OF SHIPPING.

ILLUSTRATIONS OF THE SUGGESTIONS FOR THE CONSTRUCTION AND CLASSIFICATION OF COMPOSITE SHIPS

1868.



a base, and longer pointing downwards; the other, according to its position, has a short, thick, horizontal, well-
defined neck, and a short, blunt, conical point.

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COMPOSITE VESSELS.

Table of Minimum Dimensions of Frames, Planking, Keels,

All plates, and all beam and angle iron, used in ships intended for classification, are to be stamped

Tonnage. <i>See Notes to Table.</i>	Distance of Frames from Moulding Edge to Moulding Edge all Fore and Aft.	Siding of Keel, Stem and Stern Post and Moulding of Stem.	Moulding of Stern Post and Keel.	Breadth and Thick- ness of Keel Plate, Flat Plate Keelson, and Thickness of Single Plate Vertical Keelson, standing upon Floors	Dimensions of Angle Iron for Frames, and the Lower Angle Irons of Box Keelsons.	Dimensions of Angle Iron for Reverse Frames, and the Top Angle Irons of Box Keelsons.	Thickness of Centre Plate Keelson, Sheerstrake, (where not planked over), also of Butt Plates for Planking in Midships.	Thickness of Floor Plates, Hooks, Crutches, Side Inter- costal and Box Keelson.	Thickness of Stringer Plates upon Beam Ends, Tie Plates on Beams, Sheer- strake (where planked over) and Topside Plating (where not planked over), Bilge Strake and Diagonal Plates on Frames and Middle Line Intercostal Keelsons.
				Breadth					
Tons. 50 and under 100	inches. 18	inches. $9\frac{1}{2}$	inches. 11	inches. 19 $\frac{8}{16}$	inches. $2\frac{3}{4} \times 2\frac{3}{4} \times \frac{5}{16}$	inches. $2\frac{1}{4} \times 2\frac{1}{4} \times \frac{4}{16}$	inches. $\frac{6}{16}$	inches. $\frac{5}{16}$	inches. $\frac{5}{16}$
100 and under 200	18	$10\frac{1}{2}$	12	21 $\frac{9}{16}$	$2\frac{3}{4} \times 2\frac{3}{4} \times \frac{6}{16}$	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{5}{16}$	$\frac{7}{16}$	$\frac{5}{16}$	$\frac{6}{16}$
200 and under 300	18	$11\frac{1}{2}$	13	23 $\frac{10}{16}$	$3 \times 3 \times \frac{6}{16}$	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{5}{16}$	$\frac{8}{16}$	$\frac{6}{16}$	$\frac{7}{16}$
300 and under 400	18	$12\frac{1}{2}$	14	25 $\frac{10}{16}$	$3 \times 3 \times \frac{6}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{16}$	$\frac{9}{16}$	$\frac{7}{16}$	$\frac{8}{16}$
400 and under 500	18	13	$14\frac{1}{2}$	26 $\frac{11}{16}$	$3\frac{1}{4} \times 3\frac{1}{2} \times \frac{7}{16}$	$2\frac{1}{2} \times 2\frac{3}{4} \times \frac{6}{16}$	$\frac{9}{16}$	$\frac{7}{16}$	$\frac{8}{16}$
500 and under 600	18	$13\frac{1}{2}$	15	27 $\frac{11}{16}$	$3\frac{1}{4} \times 3\frac{1}{2} \times \frac{7}{16}$	$2\frac{1}{2} \times 3 \times \frac{6}{16}$	$\frac{10}{16}$	$\frac{8}{16}$	$\frac{9}{16}$
600 and under 700	18	14	$15\frac{1}{2}$	28 $\frac{12}{16}$	$3\frac{1}{2} \times 4 \times \frac{8}{16}$	$2\frac{3}{4} \times 3 \times \frac{6}{16}$	$\frac{10}{16}$	$\frac{8}{16}$	$\frac{9}{16}$
700 and under 800	18	$14\frac{1}{2}$	16	29 $\frac{12}{16}$	$3\frac{1}{2} \times 4 \times \frac{8}{16}$	$3 \times 3 \times \frac{6}{16}$	$\frac{11}{16}$	$\frac{9}{16}$	$\frac{10}{16}$
800 and under 900	18	15	$16\frac{1}{2}$	30 $\frac{13}{16}$	$3\frac{3}{4} \times 4\frac{1}{2} \times \frac{9}{16}$	$3 \times 3 \times \frac{7}{16}$	$\frac{11}{16}$	$\frac{9}{16}$	$\frac{10}{16}$
900 and under 1000	18	$15\frac{1}{2}$	17	31 $\frac{13}{16}$	$3\frac{3}{4} \times 4\frac{1}{2} \times \frac{9}{16}$	$3 \times 3\frac{1}{4} \times \frac{7}{16}$	$\frac{12}{16}$	$\frac{10}{16}$	$\frac{11}{16}$
1000 and under 1200	18	16	$17\frac{1}{2}$	32 $\frac{14}{16}$	$3\frac{3}{4} \times 4\frac{3}{4} \times \frac{9}{16}$	$3 \times 3\frac{1}{2} \times \frac{8}{16}$	$\frac{12}{16}$	$\frac{10}{16}$	$\frac{11}{16}$
1200 and under 1500	18	$16\frac{1}{2}$	18	33 $\frac{14}{16}$	$3\frac{3}{4} \times 4\frac{3}{4} \times \frac{9}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{8}{16}$	$\frac{13}{16}$	$\frac{11}{16}$	$\frac{12}{16}$
1500 and under 2000	18	17	$18\frac{1}{2}$	34 $\frac{15}{16}$	$4 \times 5 \times \frac{10}{16}$	$3\frac{1}{2} \times 4 \times \frac{9}{16}$	$\frac{13}{16}$	$\frac{11}{16}$	$\frac{12}{16}$
2000 and under 2500	18	$17\frac{1}{4}$	19	$34\frac{1}{2}$ $\frac{15}{16}$	$4 \times 5\frac{1}{2} \times \frac{10}{16}$	$3\frac{1}{2} \times 4\frac{1}{2} \times \frac{10}{16}$	$\frac{14}{16}$	$\frac{12}{16}$	$\frac{13}{16}$
2500 and under 3000	18	$17\frac{1}{4}$	$19\frac{1}{2}$	$34\frac{1}{2}$ $\frac{15}{16}$	$4 \times 6 \times \frac{11}{16}$	$3\frac{1}{2} \times 4\frac{1}{2} \times \frac{10}{16}$	$\frac{14}{16}$	$\frac{12}{16}$	$\frac{13}{16}$
3000 and under 3500	18	$17\frac{1}{2}$	$19\frac{1}{2}$	35 $\frac{16}{16}$	$4 \times 6\frac{1}{2} \times \frac{11}{16}$	$3\frac{1}{2} \times 4\frac{1}{2} \times \frac{10}{16}$	$\frac{15}{16}$	$\frac{12}{16}$	$\frac{13}{16}$

MEM.—The scantlings given in the above Table are intended for Ships the length of which, measured from the fore part of the Stem to the after part of the Stern-post on the range of the Upper Deck, does not exceed seven times their moulded breadth or ten times their depth of Hold, taken from the upper part of Floors to the top of the Upper Deck Beams.

RIVETS.	$\frac{5}{8}$ of an Inch.		$\frac{3}{4}$ of an Inch.	
	$\frac{5}{16}$	$\frac{6}{16}$	$\frac{7}{16}$	$\frac{8}{16}$
Diameter of Rivets required for Thickness of Plates - - - - -				

TABLE H.

Keelsons, Stems, Stern Posts, Floor Plates, Beams, Stringers, &c.*
legibly in two places with the manufacturer's trade mark, or his name and the place where made.

Dimensions of Angle Iron on Beam Stringers, Stringers in Hold, and Keelsons.	Diameter of Solid Pillars to Beams.		Thickness of Outside Plank.		Thickness of Upper Deck, and Plank-sheer.	Thickness of Wood Ceiling in Hold to upper part of Bilges.	Windlass.		Main Piece of Rudder from Lower Part of Counter upwards, Pall Britt and Wood Keelson, Sided and Moulded.	Tonnage.
			From the Garboard Strake up to within one-fifth of the Depth of Hold set down below the Upper Deck Stringer.	Topsides from the Planksheer to within one-fifth of the Depth of Hold set down below the Upper Deck Stringer.			See Notes to Table.	Diameter of Iron Spindle.	Diameter of Main Piece.	
	Hold.	Deck.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	Tons.
$3 \times 3 \times \frac{5}{16}$		—	2	4	$2\frac{1}{2}$	$2\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{4}$	$12\frac{1}{2}$	50 and under 100
$3 \times 3 \times \frac{6}{16}$	$2\frac{1}{2}$	$2\frac{1}{4}$	4	3	3	$1\frac{1}{2}$	$2\frac{1}{2}$	14	11	100 and under 200
$3 \times 3 \times \frac{6}{16}$	$2\frac{3}{4}$	$2\frac{3}{8}$	$4\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{4}$	$1\frac{3}{4}$	$2\frac{3}{4}$	15	12	200 and under 300
$3 \times 3\frac{1}{2} \times \frac{6}{16}$	$2\frac{7}{8}$	$2\frac{3}{8}$	$4\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	2	3	16	13	300 and under 400
$3 \times 4 \times \frac{6}{16}$	3	$2\frac{1}{2}$	5	4	$3\frac{1}{2}$	$2\frac{1}{4}$	$3\frac{1}{4}$	17	14	400 and under 500
$3\frac{1}{2} \times 4 \times \frac{7}{16}$	$3\frac{1}{8}$	$2\frac{1}{2}$	5	4	$3\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{1}{2}$	18	$14\frac{3}{4}$	500 and under 600
$3\frac{1}{2} \times 4\frac{1}{2} \times \frac{7}{16}$	$3\frac{1}{4}$	$2\frac{1}{2}$	$5\frac{1}{2}$	$4\frac{1}{2}$	$3\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{5}{8}$	19	$15\frac{1}{2}$	600 and under 700
$4 \times 4\frac{1}{2} \times \frac{8}{16}$	$3\frac{3}{8}$	$2\frac{1}{2}$	$5\frac{1}{2}$	$4\frac{1}{2}$	4	$2\frac{3}{4}$	$3\frac{3}{4}$	20	16	700 and under 800
$4 \times 5 \times \frac{8}{16}$	$3\frac{1}{2}$	$2\frac{1}{2}$	6	$4\frac{3}{4}$	4	$2\frac{3}{4}$	4	21	$16\frac{1}{4}$	800 and under 900
$4 \times 5 \times \frac{9}{16}$	$3\frac{1}{2}$	$2\frac{5}{8}$	6	$4\frac{3}{4}$	4	$2\frac{3}{4}$	$4\frac{1}{4}$	22	$16\frac{1}{2}$	900 and under 1000
$4\frac{1}{2} \times 5 \times \frac{9}{16}$	$3\frac{1}{2}$	$2\frac{5}{8}$	$6\frac{1}{4}$	5	4	3	$4\frac{1}{2}$	23	$16\frac{3}{4}$	1000 and under 1200
$4\frac{1}{2} \times 5\frac{1}{2} \times \frac{9}{16}$	$3\frac{5}{8}$	$2\frac{5}{8}$	$6\frac{1}{4}$	5	4	3	$4\frac{5}{8}$	24	17	1200 and under 1500
$5 \times 6 \times \frac{9}{16}$	$3\frac{3}{4}$	$2\frac{3}{4}$	$6\frac{1}{2}$	$5\frac{1}{4}$	4	3	$4\frac{5}{8}$	$25\frac{1}{2}$	$17\frac{1}{2}$	1500 and under 2000
$5\frac{1}{2} \times 6\frac{1}{2} \times \frac{10}{16}$	$3\frac{3}{4}$	$2\frac{3}{4}$	7	$5\frac{3}{4}$	4	3	$4\frac{3}{4}$	27	18	2000 and under 2500
$5\frac{1}{2} \times 6\frac{1}{2} \times \frac{10}{16}$	$3\frac{3}{4}$	$2\frac{3}{4}$	$7\frac{1}{2}$	6	4	3	$4\frac{3}{4}$	$28\frac{1}{2}$	19	2500 and under 3000
$5\frac{1}{2} \times 6\frac{1}{2} \times \frac{10}{16}$	$3\frac{3}{4}$	$2\frac{3}{4}$	8	6	4	3	5	30	20	3000 and under 3500

For Ships which exceed these proportions, the plans to be submitted for the Committee's consideration. The depth for defining the proportions of spar decked vessels, is to be measured from the top of the floor plates to the upper side of the middle or tonnage deck beams.

$\frac{7}{8}$ of an Inch.				$\frac{1}{16}$ Inch.			Diameter of Nut and Screw Bolts for Fastening Flat of Deck		
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	3 ins. and under $3\frac{1}{2}$ ins.	- - -	$\frac{1}{8}$ inch

* For Notes relating to Table H see back.

NOTES TO TABLE H.

TONNAGE.—In flush-decked vessels having either one, two, or three decks (not being spar or awning-decked), the tonnage under the upper deck, without abatement of the tonnage of the space for the crew, or for the propelling power of steam vessels, is to regulate all the scantlings of the hull, and also the equipment of the vessel. In vessels having a raised quarter deck, or a poop, or top-gallant forecastle, or deck houses, or awning deck, or spar deck, the total tonnage below the tonnage deck is to regulate the scantlings of the hull, but the register tonnage, as cut on the main beam of sailing vessels and of steam vessels, with the addition of the tonnage of the space required for propelling power, is to regulate the equipment, and also the size of the main piece of rudder and windlass, and the keel and keelsons and their number, and the scantling of the stringer plates on the upper and lower deck beams, and the requirements as to double riveting. But in vessels where the tonnage of the erections above the tonnage deck is less than that required for crew space, then the difference between the tonnage of these erections and the tonnage of the space allowed for crew is to be added to the register tonnage, cut on the main beam, for the tonnage that is to regulate the equipment and the size of the main piece of rudder and windlass, and the keel and keelsons and their number, the scantling of the stringer plates on the upper and lower deck beams, and the requirements for double riveting.

WOOD KEEL, Stem, and Stern Post to be of the dimensions specified in Table.

KEEL PLATE.—The keel plate to be of the breadth and thickness prescribed in Table H, to be made continuous up the apron and up the inner stern-post as high as practicable, but in all cases to extend above the lower deck or hold beam stringer angle iron. Forward and aft the plate is to be curved to the form of the bearding line, and to be one-sixteenth of an inch thicker than prescribed in the Table, where it passes over the deadwoods, apron, and inner stern-post, and to be sixed as required by the form of the vessel, to have an angle iron of the size given in Table for stringer angle irons riveted on each edge, flanged to the form of the vessel to receive the plank fastenings. The keel plate to maintain its breadth for three-fifths the length of the keel amidships, and then to be gradually reduced until its edges conform with the flange of the angle iron on the keel plate forward and aft; the butts of the keel plates to be shifted clear of the keel scarps.

FRAMES.—The frames to be of the dimensions as set forth in Table, and the narrow flange to be of a parallel thickness, that the nuts of the screw bolts may fit closely. The frames to be in as long lengths as possible, fitted and riveted on to the keel plate, and extended as near to the middle line as practicable, according to the plan of construction adopted, and in all cases to extend to the gunwale, and where raised quarter decks, poops, forecastles and spar decks are constructed, to their deck stringers respectively, except when constructed with a rounded form at the gunwale, then they may terminate at the lower part of the curve; if the frames be welded, the welds to be perfect with not less than four feet shifts from the welds of next frames, or if butted to have not less than four feet shifts with four feet lengths of angle iron of the same size as the frame, fitted back to back riveted to them, and secured to the outside planking. The spacing of the frames (where one thickness of planking in the bottom is intended) not to exceed 18 inches from moulding edge to moulding edge all fore and aft, a four feet length of angle iron, the size of the frame, is to be riveted to each floor and to the keel plate, back to back with the frames.

FLOOR PLATES.—The floor plates to be in thickness according to Table, but at each end of the vessel for one quarter of her length they may be reduced in thickness one-sixteenth of an inch where the midship floor plates are six-sixteenths and under ten-sixteenths of an inch, and two-sixteenths of an inch where the plates are ten-sixteenths and above in thickness. The floor plates to be in depth at middle line according to the following rule, viz., to the vessel's depth, measured from the top of the keel to the top of the upper or spar-decked beams amidships add the extreme breadth of the vessel, two-fifths of that sum in inches to be the depth of the floor plates at the middle line well fore and aft, but at the extreme fore and after ends, they must be deeper, so as to form an efficient connection between the two sides of the vessel. The floor plates are to extend up the bilges not less than to a perpendicular height of twice and a half the depth of floor amidships, from upper side of keel at middle line; and in no case to be less moulded in any part, than a fair taper between the depth at middle line, and the moulding at their extreme ends, which is to be not less than the moulding of the frames. The ends of the floors to maintain the height prescribed amidships, for one quarter of the vessel's length, they may then be gradually lowered forward and aft until the upper edges of the floor plates are level, which place is to be determined by the form of the vessel, and from that point to the vessel's ends they are to be gradually increased in depth, so as to efficiently connect the sides of the vessel; the upper parts of the floors forward and aft are to be high enough to give ample room between the reverse frames on each side of the vessel, for fitting the keelson angle irons. In vessels having considerable rise of floor, the depth of the floor plates, on a square, at the quarter of the vessel's extreme moulded breadth, set out from the middle line, is to be not less than three-fifths the depth of the floor plate, at the middle line, and the floor plate is to be extended up the bilges, by a fair taper from middle line, until it terminates at the moulding of the frames. A floor plate to be fitted and riveted to every frame, and to be extended across the middle line; but where a vertical centre plate is adopted at middle line, then the floor plates are to be efficiently connected to it on each side by double vertical angle irons of not less size than the reversed frames. When floors extend from side to side and are made in two lengths, the butts are to have double butt straps, one on each side of the floor plates, and three-fourths the thickness of the floor plates, or else the floor plates must be lapped and treble riveted.

WATERCOURSES.—Watercourses are to be formed through all the floor plates, on each side of the middle line and at the bilges above the frames, so as to allow water to reach the pumps freely, and also through the vertical centre plate, and intercostal keelsons when such keelsons are adopted.

REVERSED FRAMES.—Reversed angle irons on frames to be in size as per Table. All vessels under 200 tons to have reversed angle iron riveted to every frame and floor plate, across the middle line, extended to the height of the upper part of the bilge, and to the gunwale on alternate frames, and to have double reversed angle irons in way of all keelsons and stringers in hold; and in addition, all vessels of 200 tons and upwards, to have reversed angle-iron extended to the upper deck beam stringer or alternate frames, and where raised quarter decks and spar-decks are constructed, to their deck stringers respectively, except when constructed of a rounded form at the gunwale, then they may terminate at the lower part of the curve; and on the remaining frames reversed angle-irons are to be fitted to above the height of the lower deck or hold beam stringer angle-iron if the vessel has two decks or tiers of beams, and to above the height of the middle deck beam stringer angle-iron, if the vessel has three decks or tiers of beams, the rivets for securing the reversed angle-iron to the frames and floor plates to be in diameter as specified in Table, and be spaced not to exceed a distance of nine times their own diameter from centre to centre; butts of reversed angle-iron to be secured with butt straps.

NOTES TO TABLE H.—*continued.*

BEAMS.—Beams to be of bulb plate, with double angle irons on the top edge, or of T bulb iron, or of any other approved form of equal strength. The upper deck beams to be one quarter of an inch in depth to every foot in length of the midship beam, and to be in thickness one-sixteenth of an inch for every inch in depth, with one-sixteenth of an inch added; if of T bulb the united breadth of the top flanges to be not less than three-fourths the depth of the beam, and where beams are formed of bulb plate with double angle-irons on the top edge, the flanges of each of the angle-irons are not to be less in their united breadth than three-fourths the depth of the beam, and to be one-sixteenth of an inch in thickness for every inch of the two sides of the angle-iron. Middle deck, hold, and orlop beams, to be one-eighth of the depth deeper, and one-sixteenth of an inch thicker than the upper deck beams. All beams to be efficiently connected with the frames by bracket ends, or knee plates, the arms of each to be not less than twice-and-a-half the depth of the beams in length, and of not less thickness than the beams. All beams for at least three-quarters the length of the vessel in midships, and in addition the beams under the bowsprit, pall bit, windlass and capstan are to be pillared; the pillars to have not less than two rivets in each of their ends, so as to form a continuous tie from the keelson to the upper deck, or spar-deck, and to be of the sizes given in Table.

IRON SHEERSTRAKE.—The iron sheerstrake to be one inch in breadth for every six feet of the vessel's length, for half her length in midships, and to be of the thickness given in Table; it may then be gradually reduced in breadth and in thickness to three-fourths of the midship breadth and thickness at her ends. The butts of the iron sheerstrake in all cases to be shifted clear of the butts of the stringer plates on the beam ends, the shift in no case to be less than equal to three spaces of frames, and all plates where practicable to be not less than nine feet long, but if the sheerstrake plates are eighteen feet long they may be of two equal breadths, but carvel plated and single riveted; butts of all plating to be fitted quite close, and in no case is the lower edge of the iron sheerstrake to be fitted less than two-thirds of the breadth required by the Rule for sheerstrake below the upper deck stringer plate. The butt straps in all cases to be in one piece, whether fitted outside or inside, and in no case to be in two pieces by being cut at the stringer plate. See Section 30.

IRON BILGE STRAKE.—The bilge strake plates to be two-thirds the breadth of the iron sheerstrake, for three-fifths the length of the keel in midships, and from thence to the ends of the vessel they are to be reduced gradually to one-half their midship breadth; the thickness of the plates to be as prescribed in Table H, and they are to be fitted at the bilges with the middle of the plate at the height prescribed for floorheads, such position for the bilge plates to be maintained, notwithstanding that the floorheads may be carried higher. They are to be extended to the ends of the vessel in accordance with her form, and properly riveted to the frame.

DIAGONAL PLATES ON FRAMES.—The diagonal plates on the frames to be not less than one-third the breadth of the iron sheerstrake, and fitted in pairs, transversely, all fore and aft, at an angle of 45°, with the butts of each pair meeting between the frames; to be of the thickness given in Table, and connected to the sheer and bilge strake plates by butt straps double riveted, and to be efficiently riveted to each other, and to each frame they cross.

STRINGER PLATES.—All vessels to have stringer plates of the thickness given in Table upon the ends of each tier of beams. Those upon the ends of the upper deck beams of one, two, and three decked vessels to be in width one inch for every seven feet of the vessel's entire length for half her length in midships, and from thence to the ends of the vessel they may be gradually reduced to three-fourths the width in midships; in no case however is the width in midships to be less than eighteen inches. The stringer plates are to be riveted to the beams and properly shifted, fitted home, and riveted to the iron sheerstrake, with an angle iron of the dimensions given in Table, and the roughtree stanchions are not to pass through them. Stringer plates on the ends of beams below the upper deck may be reduced in width to three-fourths the midship breadth of the upper deck stringer, which breadth is to extend all fore and aft, and to have an angle iron of the dimensions given in Table, extending all fore and aft, riveted to reverse angle iron on each frame and to the stringer plates. In cases where a deck is not laid, and the width of the stringer plate on ends of hold beams is objected to, it may be reduced in width, provided such reduction be fully compensated for. All stringer angle irons are to be in as long lengths as possible, properly shifted, and wherever butted to be connected with angle iron or plate iron not less than two feet long, fitted in the throat of them, properly riveted to each flange, and the thickness of the connecting plates not to be less than the angle iron they cover. Upper deck gutter waterways are to be flooded to ascertain if there be any leakage, and when completed they are to be properly cemented.

TIE PLATES.—All vessels are to have tie plates ranging all fore and aft upon each side of the hatchways on each tier of beams, and in addition thereto the beams of the upper and middle decks in three decked or spar decked vessels, and of the upper deck in vessels of one or two decks must have tie plates fitted from side to side diagonally, in number one pair for about every 35 feet of the vessel's length; these plates in both cases must not be less in width than once and a half the depth of the beams of their respective decks, and of the thickness required for stringer plates; they are to be well riveted to each other and to the beams and stringers, and to have intermediate fastenings into the deck plank between the beams, in all cases their butts to be chain riveted. Upon hold beams where a deck is not to be laid, a tie formed of double angle irons of the size given for the main frames of the ship may be fitted each side of the hatchways in lieu of tie plates, but if the beams are made of such additional strength laterally as not to require the support given by the said angle irons or tie plates, double angle irons of the above size fitted at the centre line, from opening to opening, may be substituted. All hatchways and mast holes are to be properly framed to receive half beams where required, and the latter to have mast partners at each tier of beams (except at orlop beams), the plating of which is not to be less in thickness than is required for stringer plates, and the united breadths of the plates are not to be less than three times the diameter of the masts; these plates to be well riveted to each other, and to the beams, and angle iron carlings, and at the decks where the masts are to be wedged, an angle iron of the dimensions required for the main frame of the ship is to be properly fitted and riveted to the plate round the mast hole. The mast holes, skylights, and companions must be properly secured to the satisfaction of the Surveyors. Where wood coamings are fitted plates are to be riveted to the beams to which the deck ends are to be fastened.

BUTT STRAPS.—Butt straps in all cases, except those of floor plates (see Section 13) to be one-sixteenth of an inch thicker than the plates they connect, and to be fitted with the fibre of the iron in the same direction as that of the plates, and riveted as per Section 4.

NOTES TO TABLE H.—*continued.*

BUTT PLATES OF OUTSIDE PLANKING.—The plates to which the butts of the outside planking are to be secured, must be of the breadth of the planks, and extend from frame to frame, efficiently riveted thereto, and of the thickness given in Table, but on the bows and quarters or wherever else the plank ends may have a tendency to strain off, they are to be one-eighth of an inch thicker than therein prescribed.

RIVETS AND RIVETING.—The rivets to be of the best quality, and to be of the diameter as per Table, the rivet holes to be regularly and equally spaced, and carefully punched opposite each other in the adjoining parts, from the faying surfaces in the laps, lining pieces, butt straps, and frames, and to be countersunk where required, the rivets not to be nearer to the butts or edges of the plating, lining pieces to butts, or of any angle iron, than a space equal to their own diameter, and not to be further apart from centre to centre than five times their diameter, or nearer than four times their diameter from centre to centre, and to be spaced through the frames and outside plating, and in reversed angle iron a distance equal to nine times their diameter from centre to centre. All butts of iron plating, excepting those of poops and top-gallant forecastles, to be at least double riveted, and a space equal to twice the diameter of the rivets to be between each row; where treble riveting is adopted, a space equal to twice the diameter of the rivet to be between each row, with half the number of rivets in the back row.

KE GARBOARD STRAKES.—The garboard strakes not to be less than two-thirds the depth of the keel prescribed in Table, and properly rabbed into it, to be fitted closely to the iron keel plate, and to be of sufficient width. The butts of the garboard strakes to have not less than four feet six inches shift from the butts of the garboard strake on the opposite side of the vessel, nor less than the same shift clear of the keel scarph. For bolting, see *Section 33.*

PLANKING.—The planking to be thoroughly seasoned, quite free from sap, wane, or other defects, to be wrought with the heart side to the frames, and with not less than three strakes between the butts, without step butting, and with not less than six feet shifts; the garboard strakes to be shifted and of the thickness given in *Section 7.*; the bottom planking is not to be less in thickness than prescribed in Table, from the garboard strakes up to within a fifth of the depth of hold set down below the upper deck stringer plate, from thence to the planksheer to be in thickness as prescribed in Table for topsides; or, if preferred, the bottom planking may retain its thickness up to within a fourth of the depth of the hold set down below the upper deck stringer plate, and from thence to the planksheer be gradually diminished in thickness to that prescribed in Table for topsides; the thickness of the wood sheerstrakes may be the thickness of the iron sheerstrake they cover less than that prescribed by Table. Outside planks (except the garboard strakes) are not to be more than twelve inches broad; they are to be fitted quite close to the frames and plates, and to each other at their inner edges, and wrought with proper seams outside in proportion to their thickness; the hood-ends may be reduced one-fifth from the thickness given in Table, at the stem or stern-post, and one-third at the buttock. The caulking edge of the keel seam, and hood-end seams of the planking at the stem and stern-post, need not exceed from two and a half inches to four inches, in proportion to the tonnage of the vessel; which can be arranged by trimming the back rabbet from the bearding line as required, so as not to unnecessarily reduce the keel, stem, and stern-post. Furrans or pads are in no case to be used.

DECKS.—The flat of all decks to be of good quality, properly seasoned, free from sap and objectionable knots, the thickness and fastenings as per Table. The upper deck plank to be fastened by screw bolts from the upper side with nuts at the under side of the angle irons of the beams and to the tie plates, see *Section 29.* The bolts must be properly sunk, with oakum and white lead under their heads, and be carefully covered over with turned dowels, their fibre in the same direction as the deck plank, and bedded in white lead, marine glue, or other suitable composition. When the deck planks are six inches in width and under, single fastening will be sufficient; but when they are above six inches and not exceeding eight inches in width, there must be two bolts in each plank in every beam, one of which may be a short screw bolt; and planks exceeding eight inches in width must be double fastened with nut and screw bolts. If the deck is of Teak it may be one-eighth less in thickness than prescribed in the Table. When a deck originally required to be 4 inches thick is worn to 3 inches; $3\frac{1}{2}$ inches to $2\frac{3}{4}$ inches; 3 inches to $2\frac{1}{2}$ inches, it must be renewed, unless it be found on survey to be in good condition, when on application the case will receive the consideration of the Committee.

CEMENT.—All vessels to be efficiently cemented in the bottom to the upper part of the bilges, care to be taken to have proper water courses above the cement all fore and aft.

WINDLASS.—The diameter of main piece of windlasses in Steam Ships may be seven-eighths of that required in the Table, provided always the body of the windlass be not of unusual length.

COMPOSITE VESSELS.

TABLE I.

Exhibiting the Number of Years to be assigned to
the different descriptions of Timber used in Composite Vessels.

The same to be of good quality, properly seasoned, and free from defect.

TIMBER.	KEEL.	Stem, Sternpost, Apron, Inner Stern- post, Deadwood, Knightheads and Hawse Tim- bers.	Floors, Wood Frames and Ceilings upon them; Beams and Keelsons.	OUTSIDE PLANK.		Upper Deck Waterway, Spirketting Planksheer, and Roughtree Timbers.	RUDDER, WINDLASS, and PALL BITT. — Main Pieces.
				From Top of Keel to Two-fifths the Depth of Hold (a)	From Two-fifths the Depth of Hold (a) to Gunwale.		
1 East India Teak	16	16	16	16	16	16	16
2 Greenheart, Morra, Iron Bark	14	12	12	14	12	12	14
(b) Live Oak, English, African, French, Adriatic, Italian, Spanish, and Portuguese Oaks	14	12	12	12	12	12	14
4 Pitch Pine, Oregon and Huon Pine, Larch, Hackmatack, Cowdie or Kaurie Pine ..	9	9	9	12	10	10	—
5 (b) Northern Continental Oak	12	9	9	12	10	10	9
6 (b) American White Oak	10	7	7	10	8	7	7
7 Dantzie, Memel, Riga, and American Red Pine	9	8	8	10	9	10	—
8 American Rock Elm	16	—	8	16	6	6	—
9 (c) English and French Elm, and Beech	16	—	—	16	—	—	—
10 Spruce Fir, Swedish and Norway Red Pine	—	—	—	8	8	—	—

(a) That is, two-fifths the depth of hold taken from the top of floors to the top of upper or tonnage deck beams, set up from the keel plate, in midships; which height is not to be exceeded fore and aft on a straight line.

(b) Live Oak, English, French, Adriatic, Italian, Spanish, and Portuguese Oak will be allowed to be used for stems, and for the bow and buttock planks where East India Teak would be liable to break in working, in vessels otherwise built of 16 years' timber material.

(b) Whenever any of the Oaks, or other woods of an acid nature are used, the best Hair Felt, Canvas, or other approved material, in addition to paint, is to be placed between them and the Iron Plates and Angle Irons.

(c) English and French Elm allowed for Garboard Strakes and Planking of flat of bottom in Ships of the 16 years' grade.

Where parties are desirous of using Woods not inserted in the Table, special application to be made to the Committee.

COMPOSITE VESSELS.

TABLE K.

Exhibiting the Sizes of Bolts, and Pintles of Rudder.

TONNAGE. (See Section 23).	Deadwood Keel (b) Stem (a) and Stern Post Bolts.	Bottom Plank, Scarps of Keel, and Thwartship Garboard, Bolts.	Topside, Waterway, and Planksheer Bolts.	Chain Plate Bolts.	Pintles of Rudder.
50 and under 100	$\frac{7}{8}$	$1\frac{0}{6}$	$\frac{9}{16}$	$1\frac{3}{6}$	2
100 and under 200	1	$1\frac{0}{6}$	$\frac{9}{16}$	$\frac{7}{8}$	$2\frac{1}{4}$
200 and under 300	$1\frac{1}{6}$	$1\frac{2}{6}$	$1\frac{0}{6}$	1	$2\frac{1}{2}$
300 and under 400	$1\frac{1}{6}$	$1\frac{2}{6}$	$1\frac{0}{6}$	$1\frac{1}{8}$	$2\frac{3}{4}$
400 and under 500	$1\frac{1}{6}$	$1\frac{3}{6}$	$1\frac{1}{6}$	$1\frac{1}{8}$	3
500 and under 600	$1\frac{1}{8}$	$1\frac{3}{6}$	$1\frac{1}{6}$	$1\frac{1}{8}$	$3\frac{1}{8}$
600 and under 700	$1\frac{1}{8}$	$1\frac{4}{6}$	$1\frac{2}{6}$	$1\frac{1}{4}$	$3\frac{1}{4}$
700 and under 800	$1\frac{1}{8}$	$1\frac{4}{6}$	$1\frac{2}{6}$	$1\frac{1}{4}$	$3\frac{1}{2}$
800 and under 900	$1\frac{3}{16}$	$1\frac{5}{6}$	$1\frac{3}{6}$	$1\frac{1}{4}$	$3\frac{1}{2}$
900 and under 1000	$1\frac{3}{16}$	$1\frac{5}{6}$	$1\frac{3}{6}$	$1\frac{3}{8}$	$3\frac{5}{8}$
1000 and under 1200	$1\frac{1}{4}$	1	$1\frac{4}{6}$	$1\frac{3}{8}$	$3\frac{5}{8}$
1200 and under 1500	$1\frac{5}{16}$	1	$1\frac{4}{6}$	$1\frac{3}{8}$	$3\frac{3}{4}$
1500 and under 2000	$1\frac{6}{16}$	$1\frac{1}{6}$	$1\frac{5}{6}$	$1\frac{1}{2}$	$3\frac{7}{8}$
2000 and under 2500	$1\frac{7}{16}$	$1\frac{2}{6}$	1	$1\frac{1}{2}$	4
2500 and under 3000	$1\frac{8}{16}$	$1\frac{2}{6}$	1	$1\frac{5}{8}$	$4\frac{1}{8}$
3000 and under 3500	$1\frac{8}{16}$	$1\frac{3}{6}$	$1\frac{1}{6}$	$1\frac{3}{4}$	$4\frac{1}{8}$

TONS (See Section 23).	under 150	150 and under 500	500 and under 1000	1000 and under 2000	2000 and under 3000
(a) Number of Bolts in Scarps of Keels.	6	7	8	9	10

The length of the keel scarps to be five times the mean of the siding and moulding of the keel.

(**a**) Stem Scarps are not to be less than seven-tenths the length of the Keel Scarps, and all Scarps are to be Tabled.

BOLTS. 33.—The bolts to be not less than the sizes given in Table, the garboard strakes to be cross-bolted from side to side, with bolts not exceeding four feet six inches apart.

(**b**) The wood keel to have a vertical bolt through the keel plate between each frame. The stem, stern-post, deadwood, and remainder of the keel, to be through fastened in all cases, and the bolts spaced as in the keel. The screw pointed bolts for fastening the planking when less than five inches thick to be of such form under the heads, as will prevent them from turning; their heads to be once and three-quarters the diameter of the bolts, and two-fifths their diameter in thickness, the nuts in all cases to be of the same description of metal as the bolts they are applied to, and to be in thickness equal to their diameter, and not to have less substance than three-eighths the diameter of the bolts in any part, whatever the form may be, hexagon, form being preferred. All outside planks ten inches broad and above, to be double fastened ; eight inches-and-a-half and under ten inches, double and single fastened alternately ; and under eight inches-and-a-half single fastened ; and all bolts to be double fastened. The bolt holes in the outside planks to be enlarged with a dowelling machine for the bolt heads, which in the bottom up to within one-fifth the depth of hold set down below the upper deck stringer plates are to be sunk within the surface of the planking one inch and a quarter, when dowels are intended to be used ; from thence to the planksheet they need not be sunk more than three-quarters of an inch ; the bolts to be properly driven with oakum and white lead, putty, marine glue, or other suitable composition under their heads, and in the bottom they are to be carefully covered (after the seams of the bottom are all caulked) with turned well seasoned wood dowels, the fibre of which must be in the same direction as the planking, and be driven with white lead, marine glue, or any other approved composition. Where copper or yellow metal bolts are used, the sinking of them within the surface of the planking to be optional to the above extent.

